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Volume XXV DECEMBER, 1944 No. 12

AMERICAN CONGRESS OF PHYSICAL MEDICINE

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MONDAY, FEBRUARY 12, 1945

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The Midwestern Section of the Congress is combining its sectional meeting with the Midwest Conference on Rehabilitation which is sponsored by the Institute of Medicine of Chicago, to be held at the Drake Hotel on Monday, February 12, 1945. The other cosponsors of the conference are the Chicago Medical Society, the Council of Social Agencies of Chicago and the Chicago Hospital Council. Nationally known speakers will participate. The conference will include discussion of the relation of the local community to the Veterans, federal and state rehabilitation programs, the role of industry in rehabilitation, the employability of the handicapped and the development of local rehabilitation centers. There will also be a luncheon program with specially invited guests. There will be a registration fee of $1.00. Further details will be given at a later date.

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PHYSICIANS AND THEIR GUESTS ARE WELCOME

Contents—Dec. 1944

Volume XXV No. 12

ARCHIVES OF PHYSICAL THERAPY

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EDITOR OF THE MONTH

EARL C. ELKINS, M.D.

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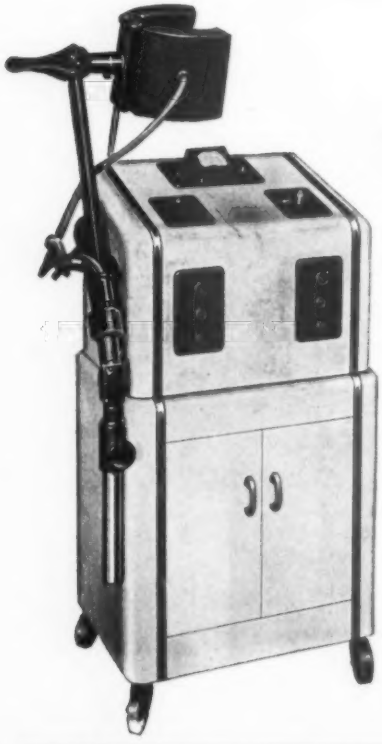

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CHANGES IN MUSCLE PROTEINS DURING MUSCULAR ATROPHY *

ERNST FISCHER, M.D.

and

VIRGINIA W. RAMSEY, B.S.

Department of Physical Medicine, Medical College of Virginia

RICHMOND, VIRGINIA

Any modern explanation of the ultimate process by which chemical energy is transformed into mechanical energy during muscular contraction considers myosin, which is the main protein of muscles, as the substrate of the contractile mechanism.[1] Contraction probably is caused by a rapid transient change of the molecular configuration and of the micellar arrangement of the myosin. These changes represent variations in the colloidal state of the myosin, and indicate that in normal muscle the colloidal state of the myosin must be a rather labile one. Despite the fact that myosin is the substrate of the contractile mechanism, little is known about the changes in myosin during muscular atrophy. From indirect evidence it seems likely that during atrophy due to upper neuron lesions or to tenotomy no changes in the relative myosin content occur. The birefringence of the muscles which is caused solely by the myosin does not change, and the tension per gram of muscle remains more or less constant during the course of these two types of atrophy.[2] In denervation atrophy, however, birefringence and the tension per gram of muscle remain constant for a limited time only and decline later at about the same rate.[3] Unfortunately, no specific chemical methods are available for estimation of the myosin content of a muscle. One can distinguish myosin from other proteins only by its various physicochemical properties; such as solubility in electrolyte solutions, viscosity and birefringence of flow. Unfortunately, none of these properties have constant values for myosin, but vary with the physiologic state of the myosin.[4] Less myosin can be extracted with alkaline phosphate buffer solution from a fatigued frog muscle than from an unfatigued muscle of the same animal, while an acid buffer solution extracts more myosin from a fatigued muscle than from an unfatigued one.[5]

The method employed in the investigation reported here also reveals mainly the changes in the colloidal state of the myosin, and conclusions concerning the amount of myosin present in the muscle can be drawn only to a limited extent. Rabbit muscles were mashed, then extracted with a 0.5 molar lithium chloride solution according to the method of Dainty and co-

* Read at the Twenty-Third Annual Session of the American Congress of Physical Therapy, Cleveland, Sept. 9, 1944.

1. Dubuisson, M.: Les processus physico chimiques de la contraction musculaire, Ann. de physiol. **15**: 443, 1939. Fischer, E. (Richmond, Va.): Changes During Muscle Contraction as Related to Crystalline Pattern, Biol. Symposia **3**:311, 1941. Bailey, K.: Myosin and Adenosinetriphosphatase, Biochem. J. **36**: 121 (Feb.) 1942. Montigel, C., and Verzar, F.: Untersuchungen ueber den Kohlehydratstoffwechsel nach Adrenenalektomie, Helvet. Physiol. & Pharmacol. Acta **1**:115, 1943.

2. Fischer, E.: Birefringence and Contractile Power of Muscles During Atrophy due to Upper Neurone Lesions or Tenotomy, Proc. Exper. Biol. & Med. **47**:277 (June) 1941.

3. Fischer, E. (Richmond, Va.): Relation Between Birefringence and Contractile Power of Normal, Hypertrophied, and Atrophied Skeletal Muscle, Am. J. Physiol. **131**:156 (Nov.) 1940.

4. Deuticke, H. J.: Kolloidzustandsaenderungen der Muskelproteine beim Absterben und bei der Ermuedung, Arch. f. d. ges. Physiol. **224**:1, 1930; Kolloidzustandsaenderungen der Muskelproteine bei der Muskeltaetigkeit, Ztschr. f. physiol. Chem. **210**:97, 1932.

5. Hensay, J.: Der Einfluss verschiedener Puffergemische auf die Loeslichkeit von Eiweisskoepern des lebensfrischen, ermuedeten, absterbenden und starren Muskels, Arch. f. d. ges. Physiol **224**:44, 1930.

workers.[6] The extracts were fractionally precipitated at a pH of 6.6, 6.9, 7.2 and 7.5 by slow addition of the extracts to buffer solutions of very low salt concentration (1/2,500 molar). The hydrogen ion concentrations were controlled continuously with a glass electrode and kept constant by titration with 1/15 molar potassium dihydrogen phosphate solution. After the extracts had settled for twenty-four hours and been centrifuged, the volume of the precipitates was determined, and then the precipitates were redissolved by the addition of equal amounts of a molar sodium chloride solution. For these final myosin solutions, the protein content was determined by the Kjeldahl method or by the refractometric method.

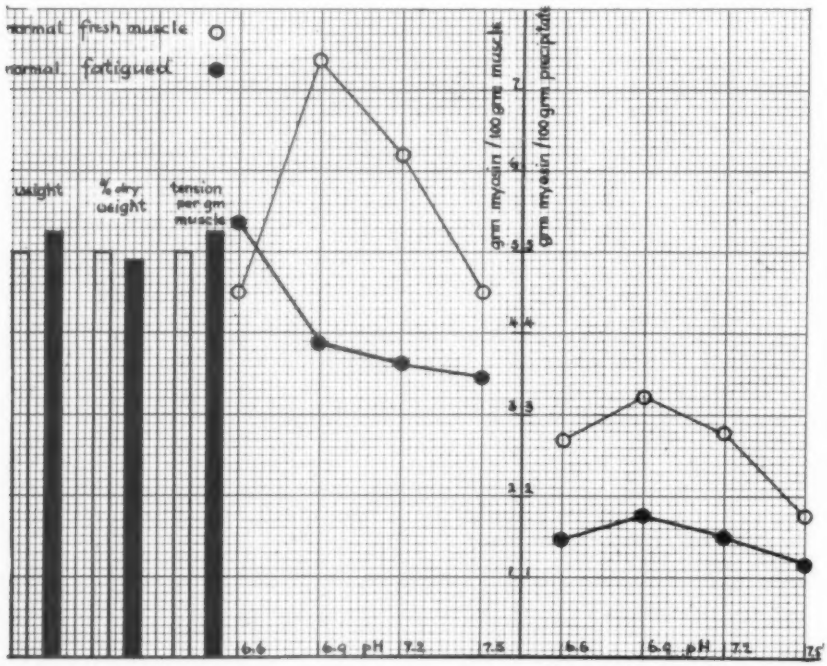

Chart 1. — Myosin changes in an unfatigued and in a fatigued gastrocnemius muscle from the same rabbit.

Chart 1 illustrates the results obtained with this method when an unfatigued gastrocnemius muscle was compared with a fatigued one from the same rabbit. Any difference revealed by extraction and reprecipitation must have been due entirely to changes in solubility and in other physicochemical changes of the myosin, since there is no doubt that fatigue as produced by five minutes of faradic stimulation cannot alter the myosin content of a muscle. The fresh muscle showed the typical "myosin curve" for normal muscles, namely a high myosin extraction per gram of original muscle, with a distinct peak at pH 6.9, which corresponds to the isoelectric point of the normal myosin. The fatigued muscle had maximal reprecipitation at a lower pH, and over the whole range investigated less protein was precipitated. Proteins which would be precipitated from the extracts in more acid solutions are generally not regarded as true myosin-like proteins.[7] Although

6. Dainty, M.; Kleinzeller, A.; Lawrence, A. S. C.; Mial, M.; Needham, J.; Needham, D., and Shen, Shih-Chang.: Studies on the Anomalous Viscosity and Flow-Birefringence of Protein Soltion. Part III. Changes in These Properties of Myosin Solution in Relation to Adenosinetriphosphate and Muscular Contraction, J. Gen. Physiol. 27:355 (Mar. 20) 1944.

7. Howe, P. E.: Differential Extraction and Precipitation of Soluble Proteins of Muscles, J. Biol. Chem. 61:493 (Sept.) 1924.

less myosin was extracted from the fatigued muscle, the precipitates were much more bulky than those of the fresh muscle. That means that the gel-like precipitates from the fatigued muscle contained much more water than those of the fresh muscle. For all muscles the myosin content per millimeter of precipitate was calculated, and a "density curve" for the precipitates at various *p*H was constructed. The difference in the density curves for the two muscles indicates that fatigue changed the colloidal state of the myosin to a considerable extent.

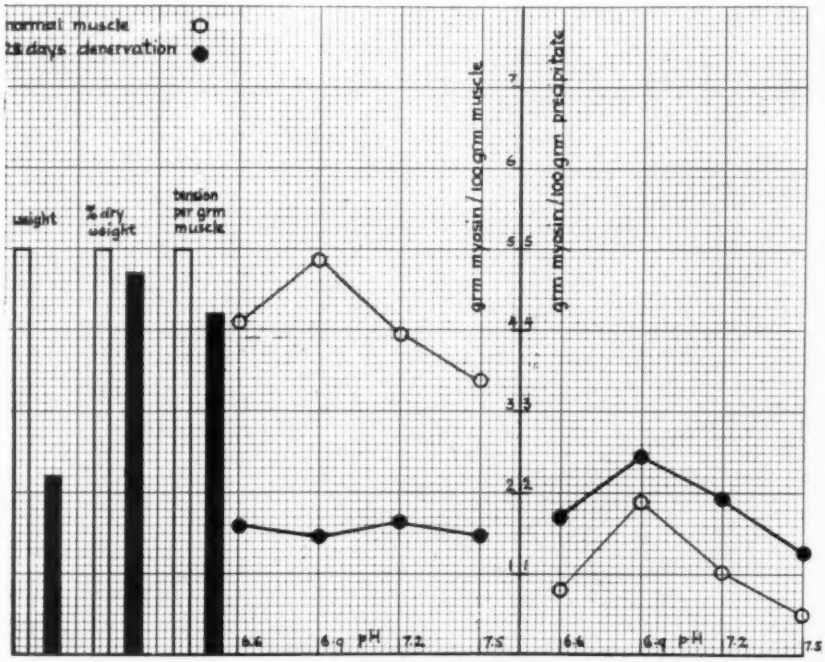

Chart 2. — Myosin changes in the late stage of atrophy due to denervation.

During atrophy due to denervation extensive changes in the physico-chemical state of the myosin are revealed by this method. In the late stage of this atrophy (chart 2), when the tension development per gram of muscle has declined, the "myosin curve" is so low, with no peak at all, that the conclusion is permissible that this decline is due not only to the diminished solubility of the muscle myosin but also to a decreased myosin content of the atrophied muscle. This would be in agreement with the idea that a denervated muscle at this stage of atrophy shows a decline in birefringence. That the extracted protein is still myosin-like is indicated by the "density curve" for the precipitates, which still has its characteristic peak at *p*H 6.9. However, distinct colloidal changes must have occurred, since the precipitates for the atrophied muscle were much denser than those of the normal muscle. It was generally observed that parallel with the decrease in the water content of the precipitates there was a decrease in their solubility in electrolyte solutions. In denervation atrophy of still longer duration, the observed changes were qualitatively the same, but only 15 to 20 per cent of the myosin extracted from normal muscle could be recovered from the atrophied one, and the density of the precipitates of the latter was three to four times higher than those of the control muscle.

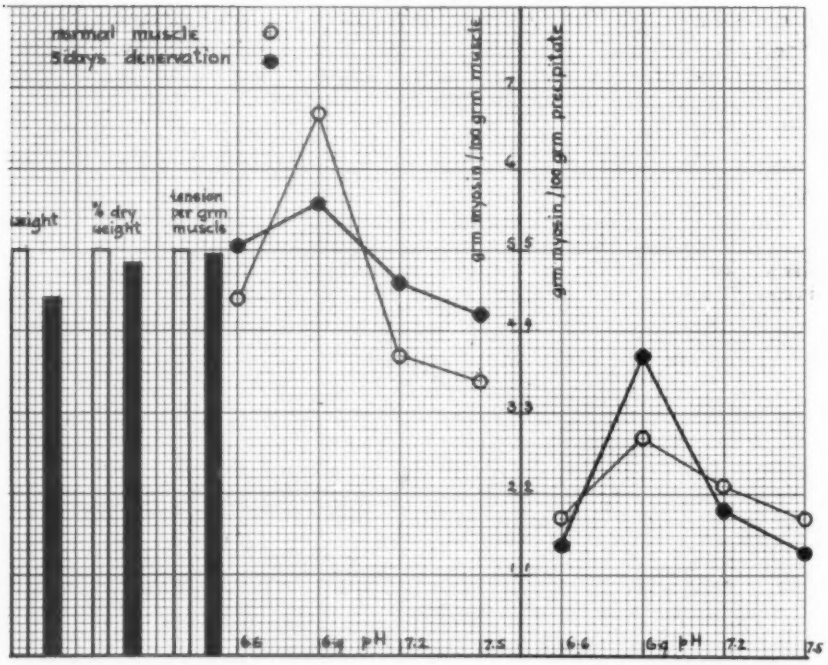

Chart 3. — Myosin changes in the early stages of denervation atrophy.

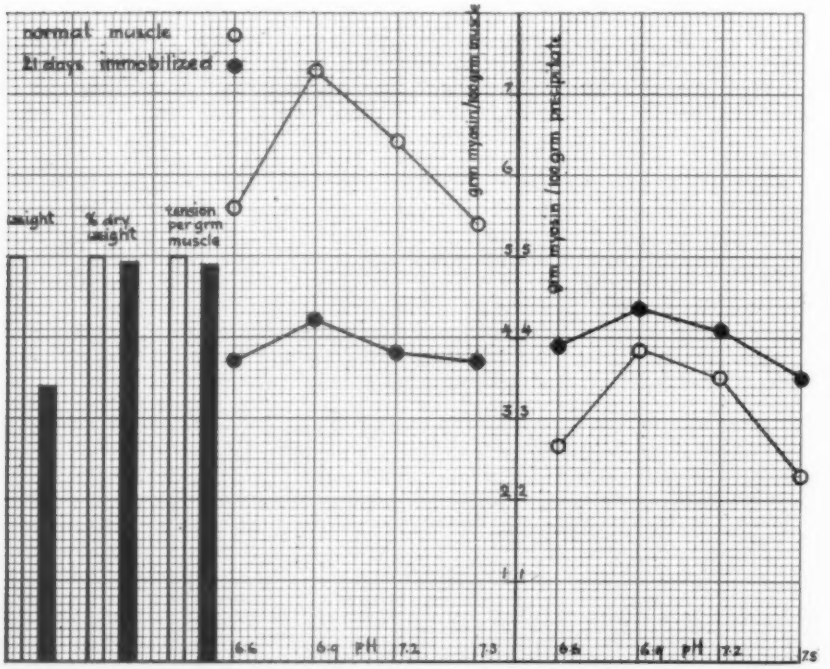

Chart 4. — Myosin changes due to atrophy from several weeks of immobilization.

In the earlier stages of denervation atrophy (chart 3), at a time when the relative tension production is not yet impaired, the myosin changes are, generally speaking, in the opposite direction. More myosin can be recovered for any hydrogen ion concentration except *p*H 6.9, at which less myosin is precipitated. Thus the characteristic peak of the "myosin curve" is distinctly less pronounced in early denervation atrophy. The density of the precipitates is lower than for the normal muscle, except, again at *p*H 6.9. For the myosin precipitated at this hydrogen ion concentration, the changes at this early stage of atrophy are already in the same direction as the general changes at the later stages.

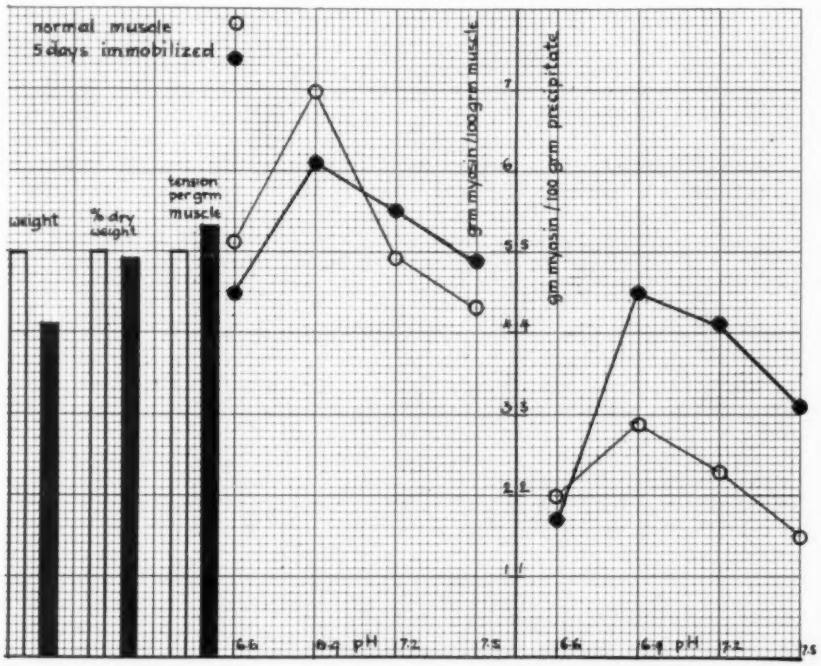

Chart 5. — Myosin changes due to immobilization of only a few days' duration.

In atrophy due to immobilization of the leg in extension for several weeks by a cast (chart 4), the myosin changes are similar to those observed in corresponding stages of denervation atrophy. However, the amount of extracted myosin always declined less in immobilization atrophy than in denervation atrophy of exactly the same weight loss. This smaller decline in extractable myosin might suggest that in immobilization atrophy only the solubility of the myosin is diminished and not the myosin content of the muscles. This assumption is supported by the fact that in immobilization atrophy the relative tension production does not decline. If a muscle has been immobilized for only a few days (chart 5), the changes in the "myosin curve"are only slight and are for the more alkaline range, as in early denervation atrophy, in opposite direction to the changes in later stages. However, in contrast to the findings in early denervation atrophy, the density of the precipitates is already distinctly increased.

Seitz[8] reported that the solubility of myosin for rabbit muscle trained by daily faradic stimulation declines less with the aging of the muscle mash than in the control. With my method I could not detect any distinct dif-

8. Seitz, W.: Weitere Untersuchungen ueber das Muskeltraining, Ztschr. f. Physiol. Chem. **218**: 17, 1933.

ference between normal muscle and muscle trained by faradic stimulation. The number of this type of experiments is still rather small, and I cannot exclude the possibility of overtraining of the muscles, which would abolish or even reverse the training effect, according to Seitz. However, appropriate electrical treatment of atrophying muscle, due either to denervation (chart

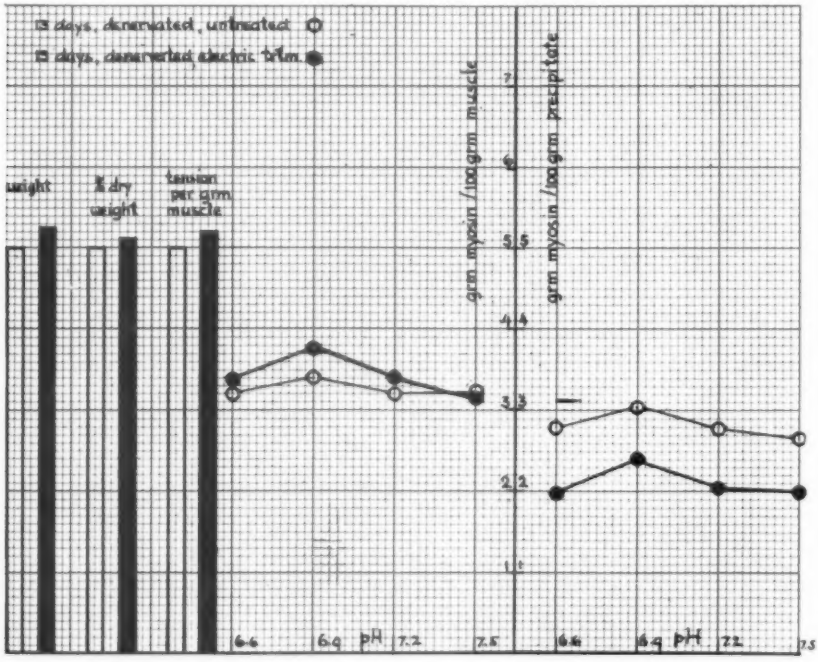

Chart 6. — Myosin changes in muscle atrophying because of denervation and receiving appropriate electrical treatment.

6) or to immobilization not only retards loss of weight and loss of relative muscle power[9] but increases somewhat the amount of extracted myosin and decreases distinctly the density of the precipitates, thus diminishing slightly the myosin changes brought about by atrophy.

In this present small series of experiments, massage proved to be a much simpler means to improve muscle condition. Five minutes of gentle petrissage applied twice daily for at least a week increases slightly the relative muscle power of a normal muscle (chart 7). It increases the amount of extractable myosin just perceptibly and decreases the density of the precipitates considerably. Continuous massage treatment from the start of denervation diminishes slightly the weight loss (chart 8) and increases distinctly the tension development per gram of muscle. At the same time, the "myosin curve" is brought back to more normal configuration, although its general level is still below normal. The density of the precipitates, which increases during atrophy, is much less for the treated muscle than for the untreated one, but the normal peak of the "density curve" at *p*H 6.9 is not restored by massage. Nevertheless it is obvious that massage retards considerably the myosin changes due to denervation atrophy.

Similar beneficial effects of massage were observed in experiments in

9. Fischer, E.: Effect of Faradic and Galvanic Stimulation Upon Course of Atrophy in Denervated Skeletal Muscles, Am. J. Physiol. **127**:605 (Nov.) 1939. Guttmann, E., and Guttmann, L.: Effect of Electrotherapy on Denervated Muscles in Rabbits, Lancet **1**:169 (Feb. 7) 1942. Solandt, D. Y.; DeLury, D. B., and Hunter, J.: Effect of Electrical Stimulation on Atrophy of Denervated Skeletal Muscle, Arch. Neurol. & Psychiat. **49**:802 (June) 1943. Hines, H. M.: Physiologic Basis for Treatment of Paralyzed Muscle, Arch. Phys. Therapy **24**:69 (Feb.) 1943.

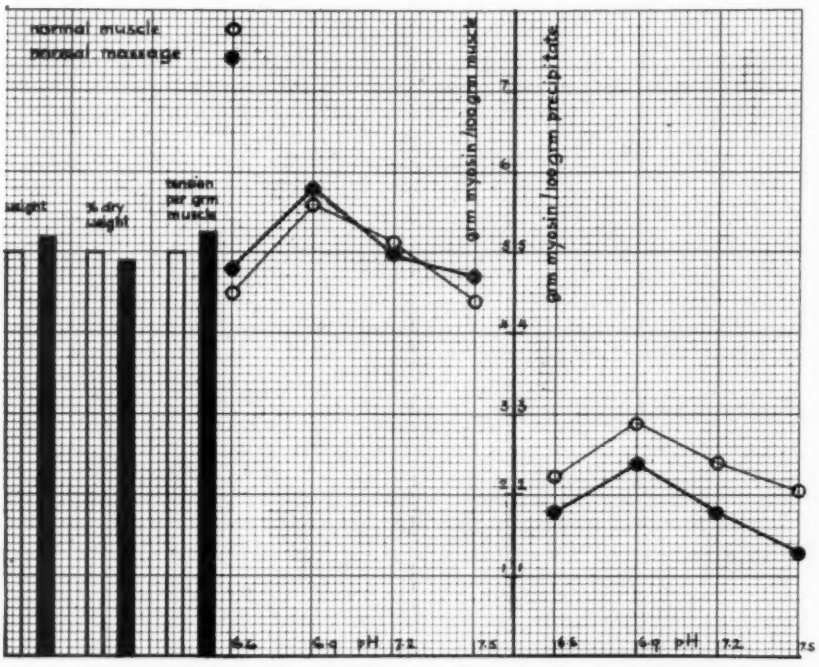

Chart 7. — Myosin changes in normal muscle treated with massage.

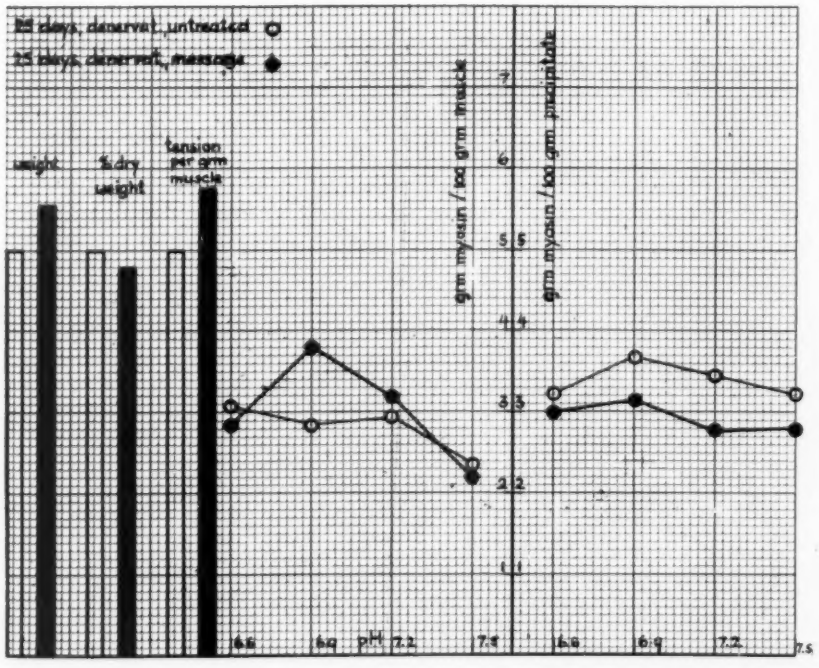

Chart 8. — Myosin changes in muscle treated with massage from the beginning of denervation.

which at first both legs were immobilized, then the casts removed and then one leg treated by massage. Although only a few experiments of this type have been performed, it is obvious that massage increases the recovery process after immobilization rather distinctly as far as it concerns muscle weight, relative power and myosin changes.

Summary

During muscular atrophy due to immobilization or due to denervation changes in the physicochemical state of the protein myosin, the subtrate of the contractile process can be detected by extraction and reprecipitation of the myosin at various hydrogen ion concentrations. The main changes observed are a diminished solubility of the myosin, a loss of its uniform isoelectric point and a tendency to form much denser precipitates. These changes can be retarded in denervation atrophy and their recovery can be speeded up after immobilization atrophy by appropriate electrical treatment or by massage.

Note: Discussions of this paper will appear in a future issue of the ARCHIVES, along with the discussion of other papers presented and discussed at the same time.

PLACE OF MANIPULATIVE PROCEDURES IN THE OVERALL TREATMENT RATIONALE FOR PAINFUL BACK CONDITIONS *

CAPTAIN FREDERICK A. JOSTES, MC-V(S), U. S. N. R.

Office of Rehabilitation, Bureau of Medicine and Surgery, Navy Department

Many physicians have yet to learn how painful and how disabling an acute condition of the back can be. It is a rather sad commentary that one should often hear a physician, suddenly struck down by such a condition, say in agony: "I never knew my patients had such pain. I always felt that much of their pain was in their minds." While some doctors are interested in cases of back pain, and understand them, know how to help the patients and like working with them, others are not interested, do not help the patients, do not understand them and therefore continue to dislike working with them.

In recent years, the surgical approach in the treatment of painful back and sciatic irritation has done much to mask the rationale of conservative treatment. Now that it has been proved that operation is not always indicated for disk involvement and in many cases is futile, it may be well to summarize a few facts about the conservative treatment of disabling back conditions.

Practitioners of medicine are too impatient to apply any one of a variety of conservative measures indicated in the treatment of certain back conditions. They want a cure-all method, which clearly cannot exist, since the causes of backache, as will be shown, are diversified. After a simple procedure produces results which are almost miraculous in the eyes of the pa-

* The opinions and assertions contained in this paper are the private ones of the writer and are not to be construed as official or as reflecting the views of the Navy Department or the Naval Service at large.

* Read at the Twenty-Third Annual Session of American Congress of Physical Therapy, Cleveland, Sept. 8, 1944.

tient. Often a patient is disgruntled when he does not experience a dramatic cure such as that described by Mr. So-and-So from down the street. "Oh, yes, doctor, he suffered intensely. Everything was done for him by the medical experts, and then he went to see another doctor, who put him through certain motions and examinations. When it was all over, Mr. So-and-So was better. Why could not the first doctors have done the same for him?" Why? Because they were mentally lazy; they thought only in terms of the major procedures. They could not see the simple remedies for the forest of operative procedures, endless bed rest, fixation without correction of the causative factors, this medication, that medication, and so on.

It is well known that backache may be the result of any of a large number of causative factors. These factors may be presented best in a simple outline, as follows:

I. Diseases —
A. Arthritis.
B. Tuberculosis.
C. Deficiency diseases. Scheuermann's disease.
D. Pyogenic infections.
E. Destruction of intervertebral disk.
F. Spondylolysis.
II. Congenital anomalies —
A. Spina bifida.
B. Failure of union of pars interarticularis.
C. Abnormal interlaminar joints.
D. Spondylolisthesis (resulting from congenital defects).
E. Platyspondylisis.
F. Sacralization of transverse processes.
III. Trauma —
A. Fractures (fresh). Fractures (old).
B. Sprains.
C. Ruptured nucleus pulposus.
D. Spondylolisthesis (purely traumatic).
E. Kümmell's disease.
F. Subluxation of apophysial joints.
IV. Postural defects —
A. Lordosis.
B. Kyphosis.
C. Scoliosis.
D. Short tensor fascie lata.

The treatment of the end product of these causative factors may embrace measures similar at times but often diversified. All measures point to removal or displacement of the causative factors. In only a small percentage of cases is surgical intervention really indicated. Then too, in view of the aftermath of such intervention, one must consider whether it is justified.

The cure of a condition causing back pain is not always so dramatic as that produced by simple manipulation without anesthesia in cases of acute or recurrent back pain brought on by some overt act which cannot be classified with acts limited by the daily routine. It is in cases of this type that manipulation has a prominent part in the over-all treatment rationale.

"But, doctor, I did nothing but stoop over the wash basin," or "I leaned over to pick up a scrap of paper from the floor," or " I lay down and could not get up because of the pain." In each one of these cases, a movement or prolonged position beyond that which has been routine for that person has produced the pain and disability. This movement may or may not have been sudden, or violent. Sometimes there is a warning of the attack. This may follow sleeping in a bed which distorts anatomic parts or riding for a long time in a car in which the upholstering does not offer adequate support,

though it may be new, or in which constant use has produced a depression into which the back and buttocks sink. These positions prohibit normal defense against trauma or strain on tissues, ligaments and joints. Thereupon uneasiness of position, in sitting or standing, gives warning of an imminent attack. This is especially true in the case of persons who have been so unfortunate as to suffer repeated attacks.

To have had an acute attack of back pain does not mean that one is ever afterward vulnerable to such attacks. There may be further attacks, however, if the patient is not given proper care promptly. To attempt to "wear off" an acute attack or to minimize it is only to lay the foundation for later attacks. To treat the first attack properly is to set up a bulwark against further attacks or against weakness of parts which would precipitate repeated attacks.

This statement should be of iterest to all, but of especial interest to physicians in industrial medicine, where proper treatment at the right time may save the company from having a case of chronic back pain on its hands, to say nothing of the patient's right to proper treatment and protection against chronicity. With the same thought in mind, it is not wise to give a patient relief by manipulation and then not to support this relief with proper rest and additional treatment adjuncts. To give a patient prompt relief of pain and then dramatically order him or her to go about the routine and fatiguing business of active life is to invite chronicity.

Over-All Treatment Methods

It must be remembered that while any one thing done in the way of treatment may give dramatic relief of pain, each type of treatment must be supported by other methods.

It is, for example, wrong to believe that because a patient was dramatically relieved of an acute backache by manipulation without anesthesia, or by the prescription of a particular support or a firm bed, treatment was ended. Supportive measures in the way of exercises, postural correction without support, postural rest, heat, massage, bed correction and so on are essential to continued relief. The causes of backache may be classified as follows:

A. Faults in posture —

1. Standing.

(*a*) Awkward position at work bench.
(*b*) Habit of stance.

2. Sitting.

(a) Bad chair angle.
(*b*) Overstuffed furniture and automobile seats.
(*c*) Sagging upholstering.
(*d*) Improper sitting angle in chair properly constructed.

3. Lying down.

(*a*) Sagging bed.
(*b*) Inner spring mattress (curse of modern age).
(*c*) Firm mattress with hole worn by weight of buttocks.

B. Type of work performed —

1. Lifting.

(*a*) Improper lifting.
(*b*) Excessive weight.

2. Stooping at work.

3. Overhead work (causing increase in existing hyperextension).

C. Type of sport or exercise indulged in —

1. Not weight bearing (bed exercises).
2. Weight bearing, partial (swimming).
3. Weight bearing.

D. Diseases causing pain (attempted cure) —

Active treatment methods comprise (*a*) bed rest, (*b*) heat, (*c*) massage, (*d*) manipulation, (*e*) support, (*f*) exercise and (*g*) operation.

A large series of cases were observed in private practice and in four dispensaries from 1930 through 1941 and in the military service from 1941 to 1944. About 90 per cent were seen before 1941 and about 10 per cent after that year. Of the total, the condition in about 65 per cent was acute (not necessarily the first attack) and in 35 per cent was chronic (not necessarily because of repeated attacks, since frequently the first attack was of chronic nature). Treatment was carried out by hospitalization methods in about 15 per cent of cases, by semi-ambulatory methods (home treatment ranging from total to partial bed rest) in about 50 per cent and by ambulatory methods in about 35 per cent.

The following outline shows the methods of treatment utilized in this series of cases:

I. Bed rest (at least for a time), in about 66 per cent.

II. Application of heat, infra-red mostly, in about 35 per cent.

III. Massage — Extensive, in about 5 per cent. Limited, in about 65 per cent. As part of the manipulative procedure.

IV. Exercise after subsidence of acute exacerbations, in about 30 per cent, (exercise of muscles whose increase in development was essential to maintain posture correction; also exercises to maintain wide range of motion of joints as a guard against further attacks due to overt acts in which a wide range of motion would be suddenly carried out and an acute exacerbation of back pain thus precipitated).

V. Use of artificial supports —

A. Temporary (one week to three months), in about 15 per cent, (types of support: wide stockinet bandage, Osgood brace and simple wide canvas belt with or without pads).

B. Permanent (more or less), chiefly for women (corsets), in about 8 per cent, (an Osgood brace or Goldthwaite brace used alone or in addition to corsets for women; often two heavy, wide metal stays plus one cross bar were used to obtain more rigidity than ordinary heavy boning of the back of a corset could offer).

C. Shoe supports and changes in about 16 per cent (these included raising and lowering of heels, lifts and wedges).

VI. Manipulation without anesthesia, in about 65 per cent.

VII. Prescription of postural changes, in about 40 per cent (postural rest periods on any flat, firm surface; postural corrections, standing and sitting and lying down).

VIII. Operations, in about 5 per cent (operation for ruptured nucleus pulposus, in 1.4 per cent; stabilizing operation because of anatomic weakness, in 2.5 per cent; stabilizing operation because of disease, in 1.1 per cent).

With regard to ruptured nucleus pulposus, I am sure that after these years of trial the figure will be reduced in the future.

The large number of cases in which manipulation gave relief of pain and discomfort, complete or partial, temporary or prolonged, involved sprain of the lumbrosacral joint, sprain of the sacroiliac joint and sprain of interlaminar joints.

Conditions producing or contributing to these strains and the resulting pain were:

I. Marked lordosis.

II. Kyphosis, the result of Kümmell's disease and old osteoarthritis (responded frequently to mild manipulation and head suspension).

III. Short tensor fascia lata.

(Literally all patients who have any degree of lordosis for any time at all acquire this condition. A simple way of testing for it is to have the patient kneel on both knees, knees close together, point of toes on floor, as he would at church. He should try to kneel erect and extend the hips. If the tensor fasciae latae is short he either cannot extend the hips completely or has difficulty doing so, and if he has backache or sciatic irritation the pain is increased. Protracted pain due to short tensor fasciae latae may be relieved at least temporarily in one manipulation. The patient may be taught to do this test as a means of stretching the muscle).

IV. Failure of union of pars interarticularis.

V. Spondylolisthesis and reverse spondylolisthesis (careful manipulation in these cases, with no great force, frequently led to at least temporary relief).

VI. Rupture of the nucleus pulposus.

(Relief was frequently given by manipulation long before anything was known about this condition or operations for it. In many cases, after repeated attacks had been relieved by manipulation the ruptured disk was found at operation. Also, some patients who had operations for ruptured disk were relieved of the acute sciatic irritation but continued to have low back pain. Some were later relieved by operative fusion, but others were never relieved of all pain in spite of operation for rupture of the nucleus pulposus and stabilization either as separate operations or combined).

VII. Old fractures (the settling effect of fractured vertebrae frequently causes pain and is relieved by stretching or derotation).

Physicians who look askance on manipulation after proper diagnosis are losing sight of an adjunct to the treatment of back pain, a condition which every practitioner of medicine must admit presents problems which tax the diagnostic acumen and treatment finesse. This negative attitude is looked on by the layman as a lack of knowledge, a lack of interest and a basis for an accusation of neglect on the part of the physician. It discourages many persons from going to specialists in physical medicine and bone and joint work. Every well trained practitioner of medicine should know that manipulation may afford relief or partial relief if it is indicated and is properly carried out.

It was not the purpose of this paper to present details of the technic of manipulation. These details can be found in a series of articles published since 1937 in this country and in the British Isles. One such article was read before the Congress a few years ago. The American College of Surgeons has motion pictures available for demonstration.

To quote from one of our publications on manipulation: "The advantage of employing this technic without anesthesia is two-fold: the conscious patient is a very efficient check on the amount of force necessary, and the patient often supplies a ready signal to let the operator know when the reduction as such has been accomplished or relief comes."

PHYSICAL MEDICINE COMES INTO ITS OWN *

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Physical medicine broadly speaking, means the management of disease by physical agents. Such agents include heat, cold, light, electricity, massage, exercise and manipulation of various types. In this field must also be included spa therapy, climatology and hydrology. Heretofore the term Physical Therapy has been used generally to designate treatment of this type. The newer term, Physical Medicine now is being widely adopted as more accurate and descriptive, since many of the physical agents above enumerated are used not only in the treatment but also in the diagnosis and prevention of disease.

Physical Medicine is in no sense a new field of medical activity. Prehistoric man practiced it unwittingly in various forms. The waters of thermal and medicated springs enjoyed much popularity among the ancients who were well aware of the value of exercise and various forms of manipulation. The technics of modern physical medicine are but the outgrowths and modifications of practices that have come down through the ages. With the development of electronics, there have been added to the armamentarium of physical medicine many ingenious, useful electrical and mechanical devices. In spite of the great progress that has taken place in this field during the past quarter of a century, it should be emphasized that the statement made by Mock some years ago still holds true, namely, that massage, passive and active exercise, muscle training exercises and the application of heat in various forms represent the most generally useful types of physical therapy and the ones that suffice in the great majority of medical or surgical conditions.

It is one of the curious phenomena of American Medicine that until recently the majority of the medical profession of this country have exhibited little interest in and less knowledge of physical medicine. This apparent indifference to one of the oldest as well as one of the most useful fields of therapeutics has been due largely to the fact that until a few years ago the subject was either entirely omitted from the courses given to our medical students or at best was accorded an insignificant place in the medical curriculum. Consequently, physicians entered upon the practice of medicine for the most part without even a fundamental knowledge of the basic principles involved in this form of therapy. The lack of appreciation and interest on the part of the medical profession in physical medicine has made it possible for less orthodox and indifferently trained groups to become aggressively active in and to monopolize a field of therapy which must be and should always have been under the control and regulation of qualified physicians.

To those who have long had at heart the advancement of physical medicine, it is gratifying to note that this unfortunate situation which has existed too long, is in the process of being corrected. The last few years have seen a noteworthy change in the attitude not only of the medical profession as a whole but of our medical schools in particular, towards the practice and teaching of physical therapy and the closely allied field of occupational therapy. This has been brought about in no small measure by the patient

* Reprinted with permission, *The General Magazine and Historical Chronicle* **46**:195 (summer) 1944.

but well directed labors of the Council on Physical Medicine of the American Medical Association. The efforts of this group have now been supplemented by the concrete support of various individuals and foundations, notably, the National Foundation for Infantile Paralysis, which, under the leadership of Mr. Basil O'Connor, has expanded its interests, which originally centered about the study, control and treatment of infantile paralysis, to include many phases of the broader field of physical medicine. Within the year further impetus has been received from the Baruch Committee on Physical Medicine whose report has brought forth such a generous response from its originator, the Honorable Bernard M. Baruch. Further factors that are responsible for much of the popular enthusiasm evinced for physical medicine are the problems arising out of the present war. It has been said that the last war did much to establish orthopedic surgery as a recognized specialty. This war may well do the same for physical medicine. The reason for this is obvious when one considers the stupendous rehabilitation program that is in the making and realizes that in such a program physical and occupational therapy must play essential and conspicuous roles. All who have given serious thought to elevating physical medicine to the status which it deserves, are in hearty agreement that two things are necessary if this is to be accomplished: first, a sound program of basic research in physical medicine must be undertaken; second, opportunities for education in this field must be expanded and improved.

Until recently, many of the technics employed in physical medicine have lacked a foundation of fundamental scientific research. Exact information about the effects of the various physical agents employed in physical therapy is still too meager and often too uncertain. The evaluation of results has depended largely, heretofore, upon uncontrolled clinical observation. Many forms of treatment, as successful as they seem to be, rest upon imperfectly understood physiological effects. As has been stated before, the present status of physical medicine may well be compared to an inverted pyramid precariously balanced upon an apex of sound scientific facts superimposed upon which is a broad, top-heavy base of empirical practice. The necessity of sound, basic studies on the physiological action of physical agents is obvious. The paucity of such observations has done much to retard progress in physical medicine and to impair its standing with the profession. Such a program of basic research can only be carried out where the opportunity exists for the careful, clinical study of patients in conjunction with well organized departments devoted to the basic medical sciences. Progress in basic research in the various fields of physical medicine is only possible through the co-ordinated efforts of well trained clinicians and skilled investigators in such sciences as physics, chemistry, physiology, pathology, anatomy, etc.

Expanded educational programs in physical medicine involve first the organization of adequate courses both practical and didactic in the undergraduate medical schools. The opportunity should be given our medical students to become as familiar with this broad field of therapy as they are with other methods of treatment. When the present accelerated war time programs can be given up for normal, orderly curricula, it is hoped that the present meager courses in physical medicine will be expanded. Training in physical medicine should not cease with the medical school but should be carried through the interne and resident years in our hospitals. Just as internes are now required to spend a certain amount of time in the radiological department and the clinical laboratory, in the future work in the departments of physical medicine should be made part of their scheduled duties. Thus, oncoming generations of doctors will be prepared to enter

upon the practice of medicine aware of the value of physical therapy and skilled in its various technics.

The graduate schools of medicine, whose chief function is the training of qualified physicians in the various specialties, should establish comprehensive courses in Physical Medicine, leading, after requisite number of years of study to the degree of Master or Doctor of Medical Science in Physical Medicine just as at present such degrees are conferred upon those who qualify in such branches as Surgery, Internal Medicine, Ophthalmology, Otolaryngology and other specialties. Such a plan will develop in the course of a few years a group of physicians not only qualified to practice physical medicine but also to teach this subject in the institutions where departments of physical medicine will unquestionably be established in the near future.

Interest in the teaching of Physical Medicine must not be limited to physicians. It must continue to be directed towards the extension and improvement of courses in physical therapy for lay technicians. At present, the demand for well trained technicians far exceeds the available supply. This demand will steadily increase as the rehabilitation program expands. This urgent need must be met by a prompt increase in the output of qualified physical therapy technicians.

It is apparent that such a program of research and education can only be carried out successfully and economically in institutions where the facilities and trained personnel are available. It is therefore, generally agreed that the establishment of centers for the further development of physical medicine must be limited to large universities within which schools of medicine exist in close approximation with opportunities for scientific instruction and investigation. It should be a source of gratification to the alumni of the University of Pennsylvania to realize that those who are charged with the direction of medical activities in that institution, have long been aware of the importance of physical medicine and recognized that at Pennsylvania there exist all the elements necessary to establish a modern center for research and instruction in this subject.

During the latter part of 1943, a well considered plan was worked out at the University of Pennsylvania which outlined a long range, comprehensive program in physical medicine. This plan was received with such approval by the officers and scientific advisory groups of the National Foundation for Infantile Paralysis that it was accorded generous support in the shape of a substantial grant. The sincere thanks of all Pennsylvanians and particularly those who are concerned with the future of Physical Medicine, is due Mr. Basil O'Connor and those associated with him in the administration of the National Foundation for Infantile Paralysis; whose public-spirited generosity and broad vision of the future possibilities and far reaching importance in physical medicine, made possible this new undertaking. On January first of this year, a grant of $150,000.00 was made to the Graduate School of Medicine for a five year period, during which it is believed that comprehensive and effective teaching in physical medicine can be organized and research of an important and fundamental character in this field, set in motion.

Shortly after the beginning of the present year, the Trustees of the University of Pennsylvania announced the establishment at the University of a Center for Research and Instruction in Physical Medicine. This new department was placed in charge of a clinician who had long been associated with the teaching of internal medicine in the medical schools of the University. This director is given the responsibility of directing and co-ordi-

nating all the activities in physical medicine in the medical schools and hospitals of the University of Pennsylvania.

The functions of this new department of physical medicine are threefold. The immediate task has been to reorganize the departments of physical therapy that have for many years existed in the University Hospital and the Graduate Hospital. This has involved certain changes in personnel and the acquisition of new equipment in addition to various steps designed to expand and rejuvenate these essential hospital activities. The necessity for an efficient department of Physical Medicine in any hospital is apparent when it is appreciated that ten per cent of all patients in civilian practice require some form of physical therapy. In institutions that deal primarily with patients from our armed forces, the percentage is definitely higher. It has been stated that at the Walter Reed Hospital, one of our great army hospitals, approximately twenty per cent of all admissions are referred at some time to the department of physical medicine. As the problems of rehabilitation become more pressing this percentage will definitely increase. The present situation bears out the statement made by Colonel Frank Billings, Chief of the Army Rehabilitation Service, after World War I, when he stated, "Every hospital needs a physical therapy department as much as it needs an operating room." The development of physical therapy in the hospitals of the University of Pennsylvania is being greatly aided by the close, enthusiastic co-operation of various clinical departments, notably those that are concerned with orthopedic surgery, diseases of the nervous system, rheumatic conditions, and disturbances of the circulation of the limbs. Every effort is being made to develop in the staffs of these hospitals an awareness of the importance of physical medicine, so that they will come to look more and more upon this hospital unit as an indispensable adjunct to the practice of medicine in the same way that they have long regarded an x-ray department. It is hoped that the new departments of physical medicine will not only prove of increasing value to the hospital organization but will be equally helpful to the medical profession of Philadelphia.

The second responsibility of the department of Physical Medicine is educational. It continues to direct instruction in this form of diagnosis and therapy to the undergraduate medical students. When the end of the war allows an expansion of the medical curriculum, it is intended that this aspect of medical education shall be greatly enlarged and improved. Important steps have already been taken to establish graduate medical education in physical medicine. In the Graduate School of Medicine, there has now been developed a well-rounded basic course. This will enable qualified physicians to receive systematic training not only in the clinical but also in the fundamental scientific aspects of this specialty. This course, if successfully pursued for the required number of years, will lead to a degree in Physical Medicine. There is every prospect that as enrollment in this branch increases, Fellowships will be established. Young physicians interested in this field will thus be given opportunity to prepare themselves for teaching and research careers in Physical Medicine in the various medical institutions of this country.

The third educational activity is the further development and improvement of the course for physical therapy technicians. Such a course, which has met all the requirements for recognition as an accredited school of Physical Therapy, has been in operation for many years at the Graduate School of Medicine. Many of the leading physical therapy technicians of this country can boast of this institution as their alma mater. Improved physical facilities and higher educational requirements have already done much to

enhance the value of this course. Although the Philadelphia School of Occupational Therapy and the Occupational Therapy department of the University Hospital are not under the direct supervision of the department of Physical Medicine, they are closely affiliated with it both in teaching and in clinical activity. The interdependence of physical therapy and occupational therapy has long been recognized at the University of Pennsylvania. Their supplemental relationship is clearly understood not only by those interested in the training of technicians, but also by those who are responsible for the rehabilitation program. It is inevitable that with the development of these departments a closer and more co-ordinated educational effort is to be expected.

In many ways the most difficult obligation of the new department of Physical Medicine is to institute and co-ordinate research in this field. To successfully carry out such a program necessitates the closest affiliation between the various clinical departments and those which are concerned with basic sciences. Already the center for physical medicine is receiving invaluable aid from Dr. Bronk's well organized group in Neuro-physics. Similar help has been proffered by the departments of Physiology, Physics, Anatomy and Bio-chemistry. As projects develop it is certain that the well trained investigators of the various scientific deartments of the University of Pennsylvania will come forward with the technical assistance so essential to the successful accomplishment of fundamental research in Physical Medicine.

It should be made clear that although the activities of the department of Physical Medicine are largely dependent at present upon the grant made by the Foundation for Infantile Paralysis, the interests of that department are in no sense restricted to the field of infantile paralysis. Its scope includes the whole broad field of physical medicine. Nevertheless, this center at Pennsylvania is vitally concerned with all efforts designed to increase our knowledge of the symptoms, prevention and management of this dread disease and its disabling sequellae. Already the educational facilities of the University of Pennsylvania have been made use of in the organization of an intensive course in the modern treatment of infantile paralysis for qualified technicians in physical therapy. It may be stated with assurance that regardless of what other lines of investigation are undertaken, the Department of Physical Medicine can be counted on always to maintain a lively interest in infantile paralysis.

The most complete and accurate discussion of the present scope and future possibilities of Physical Medicine is to be found in the report of the Baruch Committee, a thoughtful and comprehensive document which combines the well considered opinions of a group of clinicians and scientists best qualified to speak on this subject. It is gratifying to note that after a study of this report it is evident that the plan devised for the development of Physical Medicine in the University of Pennsylvania is fundamentally in accord with the conclusions arrived at by this Committee. The Alumnae of the University of Pennsylvania and particularly, those of the medical department, may derive no small satisfaction from the knowledge that before any suggestions from the Baruch Committee or any other group were available, the Pennsylvania plan had been found acceptable and was actually in operation. Once more the University finds itself in the forefront of a great movement, prepared to contribute its share not only to advancement in one of the most important fields of medicine, but also to take a prominent position in the stupendous program of rehabilitation, the most urgent post-war problem which today faces our nation.

POLIOMYELITIS TREATED BY THE KENNY METHOD *

End Result Study of 29 Cases

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and

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The New York Orthopaedic Hospital took up the Kenny method of treatment for poliomyelitis in December, 1941. Since that time this treatment has been carried on as a special study in an effort to determine its value. A routine of treatment, examinations and follow-up notes are gradually evolved, and all patients were seen after discharge in a special clinic at frequent intervals. Altogether, 60 patients whose onset was in 1941 or 1942 were treated. The follow-up study lasted twenty-four months for the 1941 patients and an average of fourteen months for the 1942 patients.[1]

In surveying our material we felt that no comparative evaluation of different methods of treatment could be made. We were forced to eliminate 31 out of our 60 patients because the treatment employed previous to establishment of the Kenny routine had been too varied. We included only those patients of whom we could be reasonably sure that they had received the Kenny treatment from within the first seven days of the onset of their symptoms.

Before our findings are presented, mention should be made of several points: All patients were treated elsewhere in the acute stage. They had been treated originally in a hospital for the treatment of contagious diseases and were subsequently transferred to us. They did not include persons with light attacks, who could be discharged to their homes directly. The patients we received were, therefore, comparatively speaking, the ones with the more severe forms of the disease. When the Kenny treatment was started our staff necessarily knew little of the technic of application, though both we and the Willard Parker Hospital, which furnished us with most of our patients, had the advantage of several complete rounds by Sister Kenny during the 1941 period. As our experience grew, our technic developed. Gradually the physicians supervising the treatment and the nurses and technicians who were in charge of carrying it out took the Kenny courses in Minneapolis. For the first six months we followed Sister Kenny's technic as closely as we understood it. Later on we deviated somewhat from certain postulates, and, for instance, instituted periodic muscle testing. In several cases in which equinus deformity of the foot developed in spite of prolonged packing, posterior ankle splints were applied. It is still often difficult for us to determine exactly at what moment spasm has given way to contracture and packs are to be superseded by muscle stretching.

The routine of applying packs was not uniform. In the first group of cases at the Willard Parker Hospital, the patients were given one pack for

* From the New York Orthopaedic Dispensary and Hospital.

1. The cases here reported formed part of the material for two previous papers: Daily, Greenbaum and others summarized a group of cases and gave their impressions of the value of the Kenny treatment in the early stage of the disease (Daly, M. M. I.; Greenbaum, Jerome; Reilly, E. T.; Weiss, A. M., and Stimson, P. M.: The Early Treatment of Poliomyelitis with an Evaluation of the Sister Kenny Treatment, J. A. M. A. **118**:1433, 1942). Dr. Robert Bingham presented an intermediate follow-up study, using 24 patients from the year 1941, who are included in this report, and 36 patients mostly from previous years (J. Bone & Surg. **25**:647, 1943). This paper attempted an evaluation and comparison between different treatment methods. The so-called orthodox cases used in Bingham's studies had been hospitalized up to 30 months and represent, therefore severe cases by elimination.

fifteen minutes every two hours for twelve hours. In our hospital, an average of between four to five packs, each lasting two hours, were given daily. Only when spasm was very marked were packs given more frequently. Three particularly stiff patients were also given prolonged hot baths.

A detailed evaluation of the entire course of the illness was not possible. The patients were invariably handled in two hospitals, and, according to Sister Kenny's principles, the original status was not established in all details and no muscle evaluations were done. We are, therefore, presenting only an end result study.

Analysis of Results

We are reporting on 29 patients who received the Kenny treatment. Of these, 18 became ill in 1941 and 11 in 1942. All of the 1941 patients were followed for at least two years with the exception of 2, who were followed for only eighteen months. All the 1942 patients were followed for at least a year, the average period being fourteen months. For all 29 patients the follow-up averaged nineteen months. The average age was 8 years, with the range from 1 to 24 years, and only 4 patients were over 12.

The time of hospitalization and ambulation of patients with lower motor neuron lesions has varied at different times and in different schools. Opinions as to when a recovering muscle can safely be subjected to the strain of walking vary widely, and the teachings of Sister Kenny are also arbitrary on this point. Therefore, the time of hospitalization and ambulation could not be used for statistical evaluation.

The period of applying hot packs varied from eight to fifty-eight weeks, the average being twenty-one weeks. Seventeen patients had mostly involvement of the lower extremities, and 12 had mostly involvement of the neck, trunk and upper extremities. All 29 patients had marked stiffness in the neck, back and posterior thigh muscles.

Paralysis

Significantly impaired function due to residual paralysis of one or more extremities was present in 12 patients at the last examination. One patient had a flail shoulder and 11 had involvement of the lower extremities. The accompanying table shows the types of impaired function.

Types of Impaired Function in 12 Cases

Case	Function Affected by —	Case	Function Affected by —
1	Flail shoulder	7	Dropped foot, right; calcaneal gait, left
2	Dropped foot, unstable knee	8	Entirely flail lower extremity
3	Flail foot, unstable knee	9	Flail foot
4	Dropped foot	10	Flail lower extremity.
5	Entirely flail lower extremity	11	Dropped foot
6	Flail foot	12	Flail lower extremity

A patient with a winged scapula without essentially impaired function was classified as showing a good result, as was a patient with fair hamstrings and fair plus quadriceps muscles, but with good function of both lower extremities. The remaining 15 patients were all free of significant muscle weakness which impaired function.

Deformities

1. One patient with fair plus quadriceps muscles had knee flexion deformities of 175 and 170 degrees, respectively, and both knee joints were swollen. A synovectomy was performed and marked chronic synovitis and

extensive fibrillation of all cartilaginous surfaces revealed. These arthritic changes could not be adequately explained. In this patient, flexibility still is generally limited.

2. One foot dorsiflexes to but 110 degrees.

3. In one patient we had to perform a calcaneal tendon lengthening for equinus deformity. She also had mild scoliosis.

4. One patient has a claw foot. It dorsiflexes to but 105 degrees, and she has had an extensor hallucis transplant. This patient is generally limited in flexibility.

5. Seven patients now have definite scoliosis—persistent and proved by roentgenogram. Three of these are 13 years of age; the others are from 6 to 11. In 4, the scoliosis is the only residual of significance, with flexibility being excellent. In the remaining 3 there is a tendency to limited flexibility. [This totals up to 2 knee flexion deformities, 3 equinus deformities and 7 scolioses, making a total of 12 deformities in 11 patients. In 24 patients, flexibility was found to be within normal limits, considering that normal flexibility may show a wide range of variation.[2]]

Braces

Under our supervision, braces were used only when they definitely improved function. Nine patients were wearing braces at their last follow-up visit: 4 a dropped foot brace, 4 a long leg brace and 1 a leg brace with a pelvic band.

Residual Impairment

Of the 29 patients reported on, 10 were entirely free of either significant paralysis or deformity. Two additional patients can be classified as having no impairment for all practical purposes, these being the patient with the winged scapula and the patient with the fair to good muscles in the lower extremities, previously mentioned in the section on muscle function. Four patients have only scoliosis, with no other residual of significance. We feel that they have to be mentioned as having deformities, as all 4 are under 11 years of age and their future cannot be predicted. There are 12 patients with impaired function of one or more extremities, and 3 of these have in addition mild scoliosis. The 3 patients with foot deformities previously mentioned are included in this group. The last patient is the one with the arthritic changes in his knees. With this patient included, 17 patients out of 29 would appear to have either significant residual paralysis, significant deformity or both.

Comment

Because of the nature of poliomyelitis, it would seem to us that conclusions about the result of any treatment could be drawn only from a large group of cases in which treatment, charting, recording and evaluation were uniform regardless of the method used. Obviously, one hospital cannot have enough such cases to be of statistical significance; therefore, it seems advisable that a unified approach of recording and evaluating in cases of poliomyelitis be worked out and adopted by different institutions. In this way, their results can be either pooled or compared if different treatment methods have been used. Reports from various institutions in the existing literature cannot be compared at present, as no such uniform approach in evaluating and reporting findings has been adopted.

2. Gurewitsch, A. D., and O'Neill, M.: Flexibility of Healthy Children, Arch. Phys. Therapy 25: 216 (April) 1944.

Summary

Twenty-nine patients treated by the Kenny method and followed for twelve to thirty months are reported on.

Twelve patients of the 29 show poor function of one or more extremities due to residual paralysis.

Scoliosis is present in 7 patients.

A total of 17 patients have either poor function of one or more extremities, a significant deformity or both.

Nine patients are dependent on braces for improved function.

This series is too small to be of statistical significance with regard to such a varying and scattered disease as poliomyelitis.

THE MALPRACTICE PROBLEM *

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and

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LOS ANGELES

In reviewing the literature on medical-legal subjects, one is appalled by the number of malpractice claims made against physicians and surgeons in this country. During the depression decade of the 1930's, the incidence of claims tremendously increased. In 1937, 4,000 malpractice suits were filed against members of the medical profession in the United States, and several times that many claims were made. With war prosperity the number of appeals handled by the courts has decreased; however, during the postwar period, if an economic recession occurs the cry of malpractice will more than likely reach a new volume.

In the past, Los Angeles has been a hot bed area for malpractice actions. Persons practicing medicine in this region have found it necessary to make profound and continuous study of the problem. Data and statistics have been gathered. Insurance claims in the area show a larger total than in any similar region. In fact, the ratio is about 10 to 1 in comparison with other metropolitan areas in the United States. An observer has been appointed by the Legal Council of the Los Angeles County Medical Association to attend the trial of all malpractice actions. Efforts have been made to educate the profession and the public in respect to what malpractice is and the peculiar vulnerability of the physician to unfounded and unjust accusations, with the probable repercussions. Such repercussions will have an adverse effect on the profession and the public if the malpractice problem is not solved.

It must be recognized that public interest is affected when it has become necessary for an attending physician, while caring for his patient, to be ever on his guard toward this same patient, entertaining a feeling of insecurity unless he takes measures to safeguard himself against the possibility of an unjust malpractice claim. This is the situation in Los Angeles and Pasadena. The doctor should not have to insist, as a means of self protection, on having every patient seen by a second and independent physician. This may

* Read at the Twenty-Third Annual Session of the American Congress of Physical Therapy, Cleveland, Sept. 6, 1944.

sound a bit far fetched, but as things have been in the past he is inviting trouble if he does not have an opinion expressed by another physician to support his decision.

Experience has taught us that the most meticulous attention to the dictates of good medical practice is not sufficient to ward off unjust claims. No physician is immune. Medicine is not an exact science. Not all patients who are given medical treatment get well; many make only a partial recovery or are left with some disability or deformity. There are few conditions which respond to a sole or specific remedy or procedure. Great latitude exists for an honest difference of opinion; therefore, it is for the attending physician to exercise his best judgment in deciding what method he will follow. Later he may wish he had selected some other means. In retrospect he may see that another plan of treatment would have been better. He must often act with a certain spontaneity, without the benefit of hindsight. He does have past experience as a guide, but to serve him only in its cumulative effect and as a foundation for his judgment. Each case he handles comes to him as a new problem, and each is to receive individual consideration. In each, also, there is that possibility of error in judgment and the possibility of malpractice action. There is a growing tendency to blame the physician for any untoward or unexpected occurrence, although this may be from complications entirely beyond the control of any physician.

It is right and proper and the law requires that a surgeon have legal consent to operate. But, what about the case in which the surgeon, after exercising due skill, judgment and diligence, has made a diagnosis of appendicitis, the patient being a woman, and on opening the abdomen finds that the appendix is not involved but that other pelvic structures are diseased? Should the surgeon proceed with removal of the appendix alone? In Los Angeles suit was brought against a surgeon who removed a right tube and ovary under just such circumstances. If the diseased structures not named in the permit are left in the abdomen, is the surgeon not considered at fault? It is suggested that surgeons secure broader consent before undertaking operations. However, it should be kept in mind that one court in referring to a broad, or blanket, consent form said: "We do not understand such agreement to constitute a consent to perform operations other than the one which operating surgeons were engaged to perform unless necessity therefore arose during the authorized operation."[1]

In another case[2] a surgeon, being authorized to operate for appendicitis, removed both fallopian tubes. He was held liable therefor in the absence of a finding of consent, either expressed or implied. Other courts have said that consent to operate must be understandingly given,[3] and it must not be obtained by a false and fraudulent representation.[4]

It is apparent that a problem exists in respect to the legal adequacy of consent to operate.

In a case in which the end result is bad, it must be acknowledged that flaws can be picked in the mode of treatment rendered. Because this is true, one finds a deluge of malpractice claims on record. It is only necessary for a patient to find some physician willing to criticize the professional care that has been rendered, and the suit is on. If the critical physician is willing to testify that in his opinion the attending physician did not possess or exercise the degree of skill and care ordinarily possessed and exercised by the average reputable physician in the community, although several of

1. *Valdex* vs *Percy*, 35 (Cal.) App. (2) 485.
2. *Walz* vs. *Van Hort*, (Ohio) 125 N.E. 910.
3. *Zotrell* vs *Repp*, (Mich.) 153 N.W. 692.
4. *Fausette* vs *Grim*, (Mo.) 166 S.W. 1177.

the defendant's medical experts may testify that he did, it is up to the jury to determine the issue. And how does a lay jury determine whether a physician's care of a patient was or was not consistent with the standard of practice in the community when two medical experts say, "Yes it was," and two say, "No it was not?" These jurymen may listen to the testimony, but what kind of understanding is to govern their decision? Yet it is a matter of great interest and importance to the litigants concerned.

The defendant is handicapped from the start. He rarely is able to present a witness who can testify as to what he did in caring for his patient; hence, there is likely to be conflict in the factual testimony as to what the physician did or did not do. Obviously, the testimony of a consultant may be of great weight. In every case a carefully made medical case record will go far toward corroborating statements of the defendant physician and in aiding his defense.

In several of the large metropolitan areas in the United States it has become an established practice to present annually a series of lectures on medical-legal subjects. In Los Angeles this fall the annual Friday evening lecture series will consist of thirteen consecutive programs under the joint auspices of the Los Angeles Bar Association and the Los Angeles County Medical Association. At the request of many members of the local Bench and Bar, emphasis is to be placed on the medical factors involved in medical-legal problems. This represents a departure from previous programs. Hitherto the legal factors have been almost exclusively presented. With the program as planned, an opportunity is presented to bring better understanding of some of the physician's most serious problems to an important and representative group in our community.

What the public thinks of the medical profession as a whole, and what patients think of their attending physicians individually, are extremely important, not only as factors which influence the incidence of malpractice actions but as positive forces toward or away from socialization of medicine.

There are two classes or types of malpractice claims or suits, the legitimate and the illegitimate, or unjustifiable. Cases for legitimate action do occur. These are instances of actual malpractice. The majority of physicians desire that in such cases the injured patient receive compensation and the unfit practitioner be eliminated. However, unprejudiced analysis discloses that by far the larger part of all malpractice claims are of the illegitimate, or unjustifiable, type. These are without merit.

Of all the claims brought in the Los Angeles area, about 6 per cent consistently are in the field of physical therapy. It is rare, however, that a charge of negligence is brought against a specialist in physical therapy. Consideration of this factor leads to the conclusion that there should be a greater dissemination of information among physicians in general in respect to underlying principles and treatment technics in physical medicine. There are certain precautions which should be understood and utilized,[5] and these must be made known to the general practitioner.

In the past year or two there have been several instances in which an infant being treated with short wave diathermy, was burned. One known death occurred. If infants are to be treated with diathermy at all, every precaution should be taken.

Two recent claims are of considerable interest. Each patient was treated with short wave diathermy. Neither suffered any injury of the superficial tissues. In one case the claim was that the treatment caused the loosening

5. Hibben, John S.: Medicolegal Aspects of Physical Medicine, J. A. M. A. **118**:1038 (March 28) 1942.

of a Smith-Petersen pin. In the other case it was claimed that screws in the femur holding a metal plate were loosened.

Burns from hot water bottles and from hot compresses continue to be reported, although the majority of the claims are directed against hospitals.

Prevention is the best protection against malpractice. It eliminates the necessity of going on the defensive. The basically important rules for prevention may be briefly listed:[6]

1. Care for every patient with scrupulous attention to the requirements of good medical practice.
2. Know your legal duty to your patient.
3. Avoid unethical and destructive criticism of the work of other physicians.
4. Keep ideal medical case records in every case.
5. Do not promise too much to the patient.
6. Secure written and adequate consent for operation and for autopsy.
7. Exercise tact in handling the patient and patient's family. What a physician tells his patient, or friends or relatives of the patient, may readily be misunderstood. It is impossible in this regard to estimate the value of silence. Implications by spoken word, by gesture or perhaps by facial expression, should be avoided for self protection. The patient or those interested in him are prone to read an unfavorable meaning into everything that is done or said by the physician or his assistants.
8. Hold consultation in every case in which the patient is not doing well or in which the patient or the patient's family complains or expresses dissatisfaction.
9. Carefully supervise the work of assistants and employees and be cautious in the delegation of duties to them.
10. Learn something of the statute of limitations and its significance.
11. Check frequently the condition of all equipment and utilize every available safety installation.
12. Avoid experimentation in treatment.
13. Render sufficient care in the way of (*a*) frequency of visits, (*b*) clinical and roentgen ray investigations and (*c*) clarity of general instructions to the patient, etc.
14. Do not abandon the patient. The physician-patient relation can be legally terminated only in certain ways and under certain conditions.
15. Avoid fee disputes. Misunderstanding in the matter of fees, particularly when the question of excessive fees arises, serves as a source of avoidable irritation.

All of these items might be enlarged on and others might be added, but these should suffice to illustrate the point we want to emphasize. The physician by selfexamination may roughly determine his individual vulnerability to malpractice action.[7]

In the Los Angeles County Medical Association, we have our own malpractice and claim prevention program. This program is endorsed by our insurance carrier and is based fundamentally on the following principles:

1. We expect to pay a sufficient premium so that the insurance carrier may realize a profit.
2. About 5 per cent of our entire premiums are held back for preventive measures.
3. The manner in which the monies are collected and premiums spent must have the approval of the Committee of Medical Defense of our society.

6. Regan, Louis J.: Medical Malpractice, St. Louis, C. V. Mosby Co., 1943.
7. Ibid.

4. A roster is maintained of outstanding defense attorneys, and the physician in a defense action does not have to accept the attorney offered but may choose the counsel who is to defend him.

As an example of the insurance which is written by our indemnity company, the coverages are as follows:

Surgical coverage:
$5,000/$15,000 limits, at $48.00.
$10,000/$30,000 limits, at $60.00.

Nonsurgical coverage:
$5,000/$15,000 limits, at $39.00.
$10,000/$30,000 limits, at $48.00.

Charges for each nurse or technician over one:
First year, $5.00 additional charge.

Higher limits and specialized practices quoted on request.

Every year fewer companies are offering malpractice insurance, owing to the fact that this form of insurance is not profitable to them. In view of this fact, the rates quoted are reasonable as compared with those offered by other companies. We hope that some day the medical profession will have just one national insurance carrier. This is an ideal which may be attained ultimately, and we believe that strength would be gained thereby, that a national carrier would favorably influence the whole problem of malpractice.

Conclusions

1. The medical profession as a whole must recognize that medical malpractice is one of their paramount problems, and that present conditions created by malpractice actions are harmful to the physician and injurious to the public.

2. Every local county and state medical association should immediately put in action measures to correct it.

3. The public should be informed as to (*a*) what constitutes medical malpractice; (*b*) how really few cases of actual malpractice occur, and (*c*) the physician's duties, capacities, capabilities and limitations, and of what reasonably may be expected of him.

4. The physician must learn what he can do to safeguard himself and then put into effect every possible precaution against unjust malpractice accusations.

5. The physician should keep his practice out of the courts. To do so effectively requires considerable study. This study should be regarded not as too burdensome, but as essential.

It is our earnest desire that readers of this paper will find their interest renewed and that with rekindled energy they will respectfully present these pertinent facts to their local county and state medical associations, with the final aim in view that some day—in the not too distant future—the medical profession have one representative national malpractice insurance carrier. With a strong national representation our ideal would be accomplished, and we could enjoy greater confidence that the courts would be more profoundly and favorably influenced.

PHYSICAL MEDICINE IN A GENERAL FACILITY *

CAPTAIN E. W. FOWLKS

Medical Corps, United States Veterans Administration

PORTLAND, ORE.

Physical therapy was elevated into a highly useful science during World War I by the guiding hand and the careful forethought of Surgeon General Ireland. After the close of that struggle, the basic principles which we now know as physical medicine were carried forth into the veterans' hospitals. By the end of the 1930's the aging processes in the veterans of prior wars were causing physical therapy to narrow its scope of application to those modalities dealing with the degenerative diseases. The year 1943 saw a rebirth of the science of physical medicine in the Veterans Administration, owing to the influx of new veterans from the present world-wide conflict. These veterans are bringing with them different injuries and disease processes. This conflict has placed a new and greater responsibility on the medical officer in charge of the physical therapy unit of a general hospital. He must be constantly alert for these new, acute pathologic processes as well as for the degenerative changes in the veterans of prior wars. His diagnostic and treatment skills are constantly being tested by the physical therapy department for treatment as well as for consultative opinions as to the need of treatment or as to the type of modality to be employed.

We have found physical agents to be of great value in the treatment of all forms of arthritis, peripheral vascular disease, neurologic diseases, postoperative conditions, traumatic injuries and pulmonary and skin disease in selected cases. Not uncommonly patients with cardiac or neurosis problems filter into our department in the hope of obtaining symptomatic as well as psychologic relief. All patients referred to us are given careful cosideration as to their underlying pathologic process. They are completely reexamined physically, and the findings are carefully weighed as we formulate our methods of treatment. The patients are thus treated individually and not as a pathologic group. This promotes not only a more rapid return of function but a better psychologic background in the relationship between the technicians and the patients.

The purpose of this paper is to outline some of the methods we employ. I have selected 5 cases which I feel represent a cross section of our therapy. In each, physical medicine played a large role in the management of the pathologic states, but other therapeutic procedures were not excluded. Before presenting the cases I wish to stress the fact that it is the combination of all the various modalities and not any one modality that produces the final desired result.

CASE 1. — J. H., a 32 year old veteran of the present war, was first seen by our physical therapy department after he had spent the major portion of five months as a bed-confined invalid with multiple acute articular arthritis. He had been treated with salicylates, bed rest and an occasional radiant heat application to his legs and feet. He was very discouraged because his toes, ankles, knees, fingers, wrists and elbows were still swollen, reddened and tender. Motion of any of these joints as well as of his hip and shoulder joints produced severe pain. The rest of his general physical examination gave essentially negative results except to reveal marked dental caries.

* Read at the Twenty-Third Annual Session of the American Congress of Physical Medicine, Cleveland, Sept. 7, 1944.

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Questioning disclosed the fact that the onset had been abrupt and acute. The patient gave a history of gonorrheal urethritis for which he had received adequate sulfonamide therapy, and he appeared to have had an uneventful recovery prior to the onset of his joint disease. Roentgenograms of the affected joints revealed soft tissue swelling in addition to an acute pyogenic type of destruction about the knee joints.

This patient was immediately given sulfadiazine along with sufficient salicylates to relieve the acute pain and thus help to reduce the associated muscular spasms. Radiant heat was then applied with cradle bakers directly to the affected joints to help overcome the pain, swelling, periarticular adhesions and limitation of joint motion. Each radiant heat treatment was followed by light sedative massage above and below the affected joints and stroking gentle massage over the joints. On the second day of treatment the patient was placed on a litter and transported to the hydrotherapy department for a continuous flow bath. The temperature of the water was 99 F. for the first five minutes, was slowly raised during the next thirty minutes to 105 F. and was held at that temperature for one hour. This bath raised the patient's temperature to 102.6 F. On removal from the tub he was placed in a warm blanket pack, and he remained there until his temperature returned to 99 F. A sedative massage was then given to his extremities above and below the joints. On the third day of treatment he was given 0.2 cc. of triple typhoid vaccine intravenously. When the chill reactions became apparent, he was given 5 cc. glucocalcium intravenously. This additional medication reduces the severity of the chill and prolongs the elevation of temperature. By this method the patient's temperature was raised to 103 F., where it remained for four hours. Larger doses of the vaccine in physiologic solution of sodium chloride or 5 per cent dextrose will cause a more prolonged elevation of the temperature.

The three types of treatment in alternation were repeated throughout the course of therapy, and after a week the acute pain and swelling had started to subside. The patient was now considered semiambulant and ready for selective exercise therapy. His acutely affected joints were still given complete rest, but all joints in a subacute state or not involved were given voluntary exercise several times each day to help overcome the adhesions and thus restore normal function. After several days of active motion, he was instructed to move his joints actively through their fullest range of motion, and then gentle assistive manipulations were applied to those joints where there was evident restriction of the full range of motion. These active assistive exercises were always performed within the patient's ordinary pain tolerance.

Two weeks later the patient had graduated to the use of crutches and was exercising freely each day. His alternating treatments were continued, with the electrically heated cabinet substituted for the cradle bakers. His sulfadiazine therapy was discontinued, but all other medication was continued. He was at this time referred to the dentist and all of his dental caries removed by extractions. After six weeks of the alternating therapies, the patient was able to dispose of his crutches. During the seventh week he was discharged from the hospital without any distressing subjective or objective symptoms. For the past five months he has been driving a heavy logging truck and has not had any loss of time because of his joint disease.

Case 2. — V. F., a 48 year old veteran of World War I had had several prior hospitalizations because of multiple rheumatoid arthritis. He was found to have acute swelling and tenderness in the joints of both of his hands, wrists, elbows, feet and ankles. His fingers and hands were beginning to show typical contractures and deformities of the flipper type from atrophic arthritis. Palpation over the involved joints revealed a noticeable increase in the temperature of the skin. Active and passive motion of these joints produced a sharp, intolerable type of pain. Both legs presented marked muscular contractures, and on extension firm resistance was noticed at 120 degrees. The rest of the physical examination gave essentially negative results. The patient's history indicated that he had had these contractures for over five years and that his arthritis actually dated back fifteen years. He stated that he had been informed at other hospitals and clinics that his leg contractures were permanent and that nothing could be done to correct them.

Roentgenograms of the affected joints revealed soft tissue swelling along with considerable atrophic destruction and demineralization. The knees, however, were shown to be free of bony ankyloses.

The patient was immediately given 20 grain doses of salicylates four times daily along with 1 drachm doses of compound elixir of pepsin for protection against gastric irritation. Fifty thousand units of vitamin D was administered to this patient daily. He was then treated with the same types of alternating therapy as patient 1. In addition he was given active and passive assistive manipulations for his contractures.

These were held within his ordinary pain threshold, as no sedative drugs were employed. When the acute involvement of the joints had subsided, traction of approximately 5 pounds was applied to each leg. After four months of such treatments the contractures were found to be persistent, so he was referred to the department of surgery for alternate arthroplasties of his knee joints. Postoperatively, traction was applied to the lower extremities; exercises consisting of supervised active joint and muscular movements were employed to the extremities not operated on and sedative massage above and below the knee joints. After approximately three weeks of traction, the extremities were placed in a plaster cast which was bivalved to permit light sedative massages, careful active assistive manipulations, active assistive exercises and whirlpool and contrast baths.

Three months later this patient had regained full extension of his legs and two-thirds normal range on flexion. He now is receiving muscle reeducation and postural training by means of a mechanical walker and crutches. He is able to stand erect with a normal weight-bearing line. He is free of acute pain and other symptoms. Inspection and palpation of his hands and fingers, however, reveal typical atrophic arthritis spindling.

CASE 3. — M. McM., a 52 year old veteran of World War I, an attorney, had fallen a year ago from a second story window onto a cement driveway. He received severe compression fractures of the fourth and fifth thoracic segments of the spinal column. He was immediately taken to a private hospital, where he spent three months on a Bradford frame. On admission to the Portland facility, he presented a picture of traumatic myelitis with marked spastic paraplegia of his legs and semi-spastic paralysis of his arms. He lacked control of the urinary and rectal sphincters and had a line of skin anesthesia extending downward from his umbilical region. Over his sacral region was a deep-seated, undermining type of trophic decubitus ulcer. This ulcer measured approximately 6 by 8 inches, and in its deepest portion the periosteum of the bony structure was clearly visible.

This patient was placed on a firm mattress with full length boards beneath it. He was given daily applications of infra-red radiations for thirty minutes to his extremities in conjunction with sedative massages and passive manipulations and exercises. Sinusoidal and galvanic electrical stimulation was also used to help prevent muscular atrophy and to improve the general muscular tone and circulation. He had a frequent distressing backache at the site of his injury, and this was given prompt and good relief by short wave diathermy. In addition to the physical treatment he was given sedative medication in the form of salicylates for pain and thiamine hydrochloride orally for nerve tissue effect.

After three months of this therapy the patient had regained the use of his arms and was able to move his legs in a spastic, poorly coordinated fashion. He was then transported daily to the hydrotherapy department, where he was given sedative continuous flow baths at 99 F. These baths were beneficial both physically and psychologically. In addition they served as a good medium for underwater massage and reeducation of muscles and nerves. The origin and insertions of the muscles were explained, and the entire length of the muscles pointed out by stroking. Passive exercises were performed first, and then the patient was instructed as to the nerve pathways and asked to do the same motions actively.

One month later this patient was placed in a mechanical walker for muscular reeducation in walking and erect posture. In addition, his daily program of sedative baths, massage, electrical stimulation and muscular nerve reeducation was continued. Occasionally he had to stop walking because of a severe, spastic tapping and jerking of his left leg. He was then instructed to take a short rest period, during which he was given psychotherapy in the form of reassurance as to his walking again. In less than a month he was walking with two canes, and finally he walked alone, only carrying a cane in case his semispastic gait should throw him off balance.

His trophic ulcer, which is a common sequella in such cases, was treated with infra-red irradiation twice a day for thirty minutes. Each radiation was followed by application of a saline solution dressing (physiologic solution of sodium chloride). Once daily this dressing was removed for ultraviolet irradiation, the amount starting at 1 erythemal dose and being gradually increased to 3 erythemal doses and then held at that level. Infections are thus easily controlled and granulation with epithelialization is found to be more rapid.

At the present time this veteran is caring for his law practice and only experiences an occasional spastic spasm of his left leg.

CASE 4. — A. G., a 61 year old veteran of World War I, was admitted after a massive cerebral vascular accident. On physical examination he was found to have moderate arterial hypertension with complete left hemiplegia. He was aphasic and semi-

comatose. The left arm and the left side of the face were in a state of flaccid paralysis, and the left leg was semispastic. The deep reflexes were aggravated in both extremities, and the Babinski and Hoffman signs were present. The sphincters were only partially intact. There was an old healed compound fracture of the left femur with 1 inch shortening of the shaft. Traumatic osteoarthritis was also apparent in the right knee joint.

The patient was given supportive medical therapy in the form of theobromine, sodium salicylate, opiates, saturated solution of potassium iodide and phenobarbital. Splints were applied to the flaccid arm in an effort to prevent wrist drop. Infra-red radiation was applied daily at the bedside to both the affected extremities. Sedative massage and passive manipulations were then carried out to help prevent muscular atrophy and improve the muscular tone and general circulation. When the patient's general condition warranted he was transported to the hydrotherapy department and given daily warm sedative baths with underwater massage and passive exercises and manipulations to help overcome any tendency toward muscular contractures. After two weeks of this therapy, he was able to sit up and move his leg in a spastic, poorly coordinated manner. His left arm was still hanging loosely at his side without any apparent signs of active motion. He was then given whirlpool baths (110 F.) to the left arm and leg. After each whirlpool treatment, he was given stimulative massage, active assistive exercises and galvanic stimulations to his left upper and lower extremities and his facial muscles. Three weeks later muscle and nerve reeducation exercises were started, a mechanical walker being used and the technician giving support. Several times daily he was instructed on using the Knavel table, the shoulder wheel, the training steps and the stall bars to assist him in improving the coordination of his muscles. Today this patient is walking with a normal gait and requires no supportive appliances. His arm has normal range of motion, with good muscular control. His speech is normal, as are his reflexes.

Case 5. — J. E., a 29 year old veteran of the present war, entered the Portland facility as a bed-confined patient. Four months earlier he had fallen 15 feet from a porch and fractured the bodies of his fifth and sixth cervical vertebrae. He had been in a plaster cast for three months. On extrance his general physical examination gave essentially negative results except for the neurologic findings. He had complete paralysis of the right arm and leg, with marked weakness and partial paralysis of the left arm and leg. The deep reflexes were increased, and the Babinski sign was present on both sides, with patellar and ankle clonus.

The finger and hand muscles were spastic, with a resulting partial flexure contracture of all the fingers. He lacked sphincter control and erectile power. There were noticeable sensory disturbances from the nipples downward.

This patient was given large doses of thiamine hydrochloride orally, along with acetylsalicylic acid for painful reactions. He was transported daily to the hydrotherapy department for sedative continuous flow baths, underwater massage and passive assistive exercises. After each bath he was given gentle galvanic therapy to the motor points of his arms and legs. Muscle and nerve reeducation was likewise started, and after three weeks the patient was able to sit up for the first time since his accident. As soon as his sitting position became stable, he was given a daily whirlpool bath followed by sedative massage, galvanic electrical muscular stimulation and active assistive exercises. In the fifth week, after considerable reassurance directed toward his walking, he was placed in the mechanical walker and given postural training as well as leg exercises and muscle reeducation. Ten days later he was able to walk in a rather uncertain spastic manner with the aid of canes. His right leg remained more spastic than his other extremities, and he had to be instructed to walk with a stiff knee, as bending produced muscular spasm of this leg. Today this patient is able to walk with the support of one cane and can go up and down stairs. He has recovered complete control of his sphincter muscles but still has lack of erectile power.

Discussion

Lt. Col. Charles R. Brooke (Washington, D. C.): Physical therapy has been employed in the Veterans Administration for treatment of disabled veterans since its inception immediately following World War I. All Veterans Hospitals and some regional office clinics were adequately equipped to render necessary physical treatments and this form of therapy has been continuously employed throughout the years on a rather extensive scale. During peacetime, new equipment was added when needed and the technics of application of the various modalities have developed in accordance with the steady advancement as the result of careful clinical and research study made in this field of practice. The treatment by physical agents was not limited entirely to degenerative diseases, because hospitalization is granted

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MEDICAL NEWS

Advance Notice Eastern Sectional Meeting of Congress

The Chairman and Secretary of the Eastern Section of the American Congress of Physical Medicine and the President and Secretary of the Pennsylvania Academy of Physical Medicine, met Sunday, Dec. 3, in the office of Dr. George Morris Piersol in the physical medicine section of the University of Pennsylvania Hospital, to plan for the Spring Session of the Eastern Section to be held April 7 to 14, 1945, at the University Hospital.

It is planned to have ten papers, four of them on basic sciences related to physical medicine, given by members of the university staff. One might call this a sort of preview of the projected postgraduate school for physical medicine for research in this field. Sessions will be from 10 to 12 and 2 to 5, with an evening banquet with one speaker.

Meeting New York Society of Physical Medicine

The New York Society of Physical Medicine has announced the following program for its meeting, December 6th, 1944, in the New York Academy of Medicine Building, New York, N. Y.:

"The Pathology of Connective Tissue in Rheumatic Disorders." Clinical Considerations. Lantern Slides. Edward F. Hartung, M.D., Assistant Clinical Professor of Medicine, Chief of the Arthritis Clinic, New York Post Graduate Medical School and Hospital. Discussion opened by Richard H. Freyberg, M.D., Department of Medicine, Hospital for Special Surgery (by invitation).

"The Treatment of Rheumatic Arthritis." Lantern Slides. William R. Rawls, M.D., Chief of the Arthritic Clinic, Polyclinic Hospital and City Hospital (by invitation). Discussion opened by Cornelius H. Traeger, M.D., Chief of the Arthritis Clinic, Roosevelt Hospital and Hospital for Special Surgery (by invitation).

New England Society of Physical Medicine

The first meeting of the season was held in Boston, November 15, 1944. The program which consisted of a symposium on the treatment of bursitis of the shoulder was as follows: "Informal Remarks on Bursitis and Kindred Lesions of the Shoulder Joint," George W. Van Gorder, M.D., Orthopedic Surgeon, Massachusetts General Hospital; "Roentgenological Diagnosis and Treatment," Sidney L. Morrison, M. D., Roentgenologist, Robert Breck Brigham Hospital; "Novocain Injection Therapy," John J. Crowley, M.D., Orthopedic Surgeon, Lynn Hospital and "Indications for Physical Medicine," Wilmot L. Marden, M.D., Medical Staff, Lynn Hospital.

Dr. Arthur L. Watkins is President and Dr. William D. McFee is Secretary of the Society.

New Officers, New York Society of Physical Medicine

President, Karl Harpuder, M.D.
Vice-President, Charles G. Buckmaster, M.D.
Treasurer, Richard Kovacs, M.D.
Secretary, Madge C. L. McGuinness, M.D.
Executive Committee: William Bierman, M.D.; Edward F. Hartung, M.D.; Michael J. O'Connor, M.D.; Jerome Weiss, M.D., and Harold Neifeld, M.D., Chairman.

Physical Medicine Program at Bryn Mawr Hospital

A program devoted to physical medicine will be held at the regular meeting of the Main Line Branch, Montgomery County Medical Society at the Bryn Mawr, Pa., Hospital. Dr. George Morris Piersol will speak on "Physical Therapy in Internal Medicine," and Dr. Bror S. Troedsson will speak on "Shoulder Pain and Treatment by Physical Therapy."

Council on Medical Education and Hospitals Announces Action on Physical Therapy Schools

The Council at its meeting on November 19 voted to extend its approval to the physical therapy schools conducted by the following hospitals:

Station Hospital, Ft. Huachuca, Arizona; Lawson General Hospital, Atlanta, Georgia; Percy Jones General Hospital, Battle Creek, Michigan; Ashford General Hospital, White Sulphur Springs, West Virginia.

Approval of these abbreviated courses has been granted for the duration of the present emergency.

The school for physical therapy technicians at Army and Navy General Hospital in Hot Springs National Park, Arkansas, has been removed from the approved list inasmuch as the training program has been discontinued.

Basic Courses Added to Reconditioning Program

Basic vocational courses are being added to the Army's reconditioning program. These courses will serve a two-fold purpose by preparing the convalescent soldier for a more highly specialized position in the Army, if he returns to duty, or assisting him in securing a better position if he

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ARCHIVES of PHYSICAL THERAPY
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.·. EDITORIALS .·.

"THE INFANT IN MEDICINE"

"During the progress of a recent meeting of physicians where some of the newer electrical modalities were the principal topic of discussion, a casual observer, who happened to be a physician of rather high repute, remarked, 'They look pretty good for a bunch of quacks.' While this was said half-jestingly it no doubt reflects the sentiment, at the present time, of the majority of the recognized leaders in medicine and surgery." So said Dr. Roy W. Fouts, present vice speaker of the House of Delegates of the American Medical Association, in 1923, in an editorial in an early issue of the publication that is now known as the "Archives of Physical Therapy."

"To be the right kind of a quack is no approbrium," he continued. "The intelligent, upright, thinking man of tomorrow is usually a quack to the man of today. But were it not for the man of tomorrow, there would be stagnation." Doctor Fouts cited as example the fact that Harvey waited a long time after his discovery of the circulation of the blood before he dared announce the results of his work and the fact that Lister's ideas concerning aseptic surgery were regarded as a joke. He stressed the fact that although intelligent conservatism should be exercised, it must not curtail individual thought, and predicted, in speaking of anticipated improvements in medicine and surgery, that, "Only the men of tomorrow with unprejudiced vision and confidence will keep pace."

Then Doctor Fouts spoke of physical therapy, which he called "the infant in medicine." He described this type of treatment as "old and yet so new from the standpoint of knowledge concerning its therapeutic effects," and also said, "Prejudices are being overcome and clinical results are dispelling doubts. Today, these newer electrical modalities, grouped under the name of physiotherapy, are providing . . . a safer, saner and more rational form of treatment for human ills."

In 1923, few physicians were devoting full time to the practice of physical medicine, then known as "physiotherapy." In medical circles, the physician who spent considerable time in this type of work was regarded as an unstable hyperenthusiast who bordered on being an irregular practitioner. Most of the responsibility for the administration of physical therapy rested on a few trained technicians whose treatment of patients was based primarily on their own judgment.

Since 1923, great advances have been made in the field of physical therapy in that its value is more widely recognized than it was previously. An increasing number of physicians are showing active interest instead of indif-

ference or resistance to developments in this field. The scope of physical therapy has been broadened to include more than the electrical "modalities" discussed so enthusiastically during the earlier periods of development.

In spite of the fact that physical medicine is no longer believed to have any resemblance to quackery and that continued research is proving its merit, the general medical profession, surprisingly enough, seems to be somewhat reluctant to recognize the importance of this field. In some areas, slowness of progress undoubtedly is the result of lack of education and of trained personnel, both medical and technical. In some communities physicians still send their patients to anyone who says he can administer physical therapy, without knowing exactly what treatment the person is licensed, and therefore supposedly trained, to administer. Persons trained in fields such as dentistry, chiropody, massage and physical therapy are recognized as having an accepted place in the care of the sick, and each in his own field can give counsel and advice to the physician. Consequently, the physician and technician who are trained in physical therapy can offer invaluable aid in treatment, especially if the physician in charge of care of the patient has insufficient knowledge of this field to make definite recommendations.

Because of the increased responsibilities of wartime and lack of physical equipment, educational facilities and particularly lack of personnel, apparently few definite plans have been made or are being made by many hospitals of moderate size, small clinics and physicians. Partially through necessity, the "infant in medicine" in some sections of our country is being neglected.

Some of these conditions suggest that physical medicine even now is still in its infancy. On the other hand, growth of this comparatively new field is indicated by the demands for more extensive education and research and that those trained in physical medicine assume their rightful place in physical rehabilitation of those in the armed services. Many excellent programs are being planned and executed in military hospitals. In this respect physical medicine, once termed the "infant in medicine" is reaching adulthood as a highly specialized field. It behooves all civilian physicians and hospital administrators to look to the future, making plans to keep pace with rapid developments in rehabilitation in which physical medicine plays an important part.

Medical News

(*Continued from 738*)

returns to civilian life. The plan is being initiated at four convalescent centers: Welch, Daytona Beach, Fla.; Ft. Story, Virginia Beach, Va.; Percy Jones General Hospital, Battle Creek, Mich., and Wakeman General Hospital, Camp Atterbury, Ind., and will be extended to other convalescent centers. Seven different "job families" will be represented by the courses which include basic training in Army and business administration, automotive mechanics, graphic arts, woodworking, agriculture, music and radio and electricity.

Wakeman Field Sanitary Area Dedicated

A model sanitary demonstration area was dedicated this month at Carlisle Barracks, Pa. It has been named Wakeman Field in memory of the late Colonel Frank B. Wakeman, MC, who was Director of the Training Division, Office of The Surgeon General and former Instructor in the Department of Military Sanitation at Carlisle Barracks. Guest speakers stressed the importance of rigid sanitary measures in the field to prevent the spread of disease.

Surgical Treatment Centers

At the present time there are 45 specialized units in Army general hospitals in this country which are concerned with reconstructive surgery. They include six centers for amputations, 19 for neurosurgery, five for thoracic surgery, three for vascular surgery, eight for plastic and ophthalmologic surgery and two each for rehabilitation of the blind and deaf. The most highly qualified surgeons available in these special fields are assigned to these centers which are equipped to provide the best specialized treatment possible.

Army Medical Consultants Convene at White Sulphur Springs

The Service Command Consultants in Medicine and civilian physicians who are consultants in Medicine to The Surgeon General and The Secretary of War convened at White Sulphur Springs, Va., on October 30 and 31. Some of the speakers from the Office of The Surgeon General included Major General Norman T. Kirk, The Surgeon General; Brigadier General Raymond W. Bliss, U. S. A., Chief of Operations Service; Dr. Eli Ginzberg, Spec. Asst. Chief, Oper. Serv., Dir. Resources Analysis Div.; Colonel Augustus Thorndike, MC, Director, Reconditioning Consultants Division.

Colonel Menninger Receives Lasker Award

At the annual meeting of the National Committee for Mental Hygiene in New York City, November 9, the first annual Lasker Award in Mental Hygiene was presented to Colonel William C. Menninger, MC, Chief Consultant in Neuropsychiatry. The award this year was given for "outstanding contribution to the mental health of the men and women of our Armed Forces."

Baruch Committee on Physical Medicine

The Administrative Board of the Baruch Committee on Physical Medicine has announced the granting of an additional total sum of $185,000, which is being given by Mr. Bernard M. Baruch for the further advancement of the program in physical medicine and the physical rehabilitation of those disabled in the war. This sum has been divided into seven grants as follows: $50,000 to the Massachusetts Institute of Technology, Cambridge, Massachusetts; $40,000 to the Medical School of the University of Minnesota, Minneapolis, Minnesota; $30,000 to the Medical School of Harvard University, Boston, Massachusetts; $30,000 to the Medical School of the University of Southern California, Los Angeles, California; $15,000 to the Medical School of the University of Iowa, Iowa City, Iowa; $15,000 to the Medical School of the University of Illinois, Chicago, Illinois; $5,000 to Marquette University Medical School, Milwaukee, Wisconsin.

The grants to Massachusetts Institute of Technology and the University of Minnesota are in addition to the gift of $1,100,000 made by Mr. Baruch in April of 1944, at which time grants were made to Columbia University College of Physicians and Surgeons, New York University College of Medicine, the Medical College of Virginia and for minor research and fellowship programs for the advancement of physical medicine.

The present gift to Massachusetts Institute of Technology is in support of a five-year program of training and research in electronics, instrumentation and physics in relation to medicine, to be carried on under the auspices of the Department of Biology and Biological Engineering. It was the conviction of the Scientific Advisory Committee of the Baruch Committee on Physical Medicine that Baruch Fellows and other physicians should have more than a superficial knowledge of the physics and technology underlying the physical methods and instrumentation used in this field and it was suggested that training in this aspect might effectively be centered at the Massachusetts Institute of Technology. The program will be under the general supervision of Doctor Francis O. Schmitt, head of the department of biology and biological engineering and under immediate supervision of Doctor K. S. Lion, assistant professor of applied biophysics, who is an expert in physical instrumentation.

The grant of $40,000 to the University of Minnesota is to support the development of a three-year teaching and fellowship program in physical medicine. The primary objective of the program is to be the furtherance of fundamental training of research workers and teachers. The program has as its basis the development of scientists in the field of physical medicine. As an auxiliary to this basic training will be developed facilities

for the training of clinicians and technicians.

The other grants have been allocated from the fund of $200,000 given by Mr. Baruch in April. The sum of $30,000 was granted to Harvard University Medical School for establishment of a three-year program to provide fellowship or residencies to be used for the benefit of qualified physicians who are selected to be trained in this field. This sum will be administered by a strong standing committee on physical medicine recently appointed by Dean C. Sidney Burwell of the Harvard Medical School, composed of Doctor J. B. Ayer, Doctor D. Denny-Brown, Doctor W. T. Green, Doctor J. H. Means, Doctor A. L. Watkins and Doctor E. M. Landis (Chairman.) Appointments to the fellowships, which generally carry stipends of $2,500, will be made annually but may be renewed to provide up to three years of specialized study and research. Emphasis will be placed upon training a few men in basic research and clinical investigation.

Unusual opportunities for clinical experience and research in the psychologic and psychiatric aspects of physical medicine will be available at Harvard. The first year will be wholly or in part devoted to basic research related to physical medicine in one of the pre-clinical sciences such as physiology, anatomy or biophysics. The second year will be spent in clinical training in physical medicine at the Massachusetts General Hospital and other hospitals affiliated with the Harvard Medical School. In the third year, fellows will be assistants in physical medicine with clinical responsibilities. For candidates with extensive previous training, one year clinical fellowships will also be granted. Applicants must have an M.D. degree from an approved medical school and a minimum of one year of internship in an approved hospital. Applications may be obtained from the Dean, Harvard Medical School, 25 Shattuck Street, Boston 15, Massachusetts.

The sum of $30,000 is granted to the University of Southern California to inaugurate a program of teaching and research in physical medicine in its medical school. The sum of $15,000 is granted to the University of Illinois to inaugurate a teaching program in physical medicine at its medical school. The sum of $15,000 is granted to the Medical School of the University of Iowa to assist in a joint research and teaching program concerning the effectiveness of different methods of applying heat to the deep tissues of the human body. Finally, the sum of $5,000 is granted to the Medical School of Marquette University, Milwaukee, Wisconsin, for continuance of research in the physiology and pathology of nerves and muscles as related to physical medicine.

In discussing these grants Doctor Frank H. Krusen, the director of the Baruch Committee pointed out that Mr. Baruch had been particularly interested in the important field of electronics as applied to medicine and he said that the center at Massachusetts Institute of Technology gave promise of revolutionizing the application of electronics in the diagnosis and treatment of the sick. Doctor Krusen expressed gratitude concerning the establishment of fellowships in physical medicine at Harvard and mentioned the advantage to the field of physical medicine in having this great center assume leadership in the training of fellows. He also stated that the aid given to the University of Minnesota and the University of Southern California would extend the activities of the Baruch Committee into the midwest and far west and thus tend to strengthen this important program. In conclusion, Doctor Krusen announced that the Administrative Board does not contemplate the recommendation of any further large grants for the establishments of additional departments of physical medicine in our medical schools. He said that the Baruch Committee would now turn its main attention toward the adequate development of the centers already established, toward providing advice in the organization of proper teaching of physical medicine in medical schools and, through its strong Committee on War and Postwar Physical Rehabilitation and Reconditioning would attempt to promote proper development of physical medicine in the rehabilitation and reconditioning of both military and civilian casualties of war. The Board agreed that Mr. Baruch's gifts had served as a means of providing prompt coordination of the entire program for rehabilitation of our wounded and for the provision of the trained personnel so greatly needed in activating this program.

Pay Allowances for Women Medical Officers

Legislation under which women officers of the Army Medical Corps will be entitled to receive the same pay allowances for their dependents as are paid to all other commissioned personnel of the Army became effective on October 1.

Results of Army Reconditioning

In a little over a year of operation reconditioning has been developed to a stage where twelve thousand patients a week are being discharged to duty from the Army hospitals in the continental United States.

This statement, made by Colonel Augustus Thorndike, MC, Director of the Reconditioning Consultants Division, gave added point to his talk on the Army's reconditioning program before The Military Surgeons.

In summing up its results Colonel Thorndike said that the reconditioning program as now operating in Army hospitals has accomplished its mission of reducing the hospital readmission rate and the average period of hospitalization; has returned better conditioned soldiers to duty; and is returning disabled veterans to civilian life better fitted physically and mentally and better prepared to resume an independent, self-supporting existence.

In short, Colonel Thorndike said, reconditioning helps patients to help themselves.

President's Birthday Fund

Dedicating his birthday for the twelfth consecutive year to the fight against infantile paralysis, President Roosevelt declared that the fight against this vicious disease enemy "is a fight to the finish and the terms are unconditional surrender."

"Not until we have removed the shadow of the Crippler from the future of every child can we furl the flags of battle and still the trumpets of attack," the President stated.

The period for the Fund-Raising Appeal and the March of Dimes to The White House will be January 14-31, Mr. O'Connor announced.

The complete text of the letters follow:

November 27, 1944.

The President,
The White House,
Washington, D. C.

My dear Mr. President:

As I write, the battle against our enemies abroad is being advanced toward ultimate and complete victory on all fronts. At the same time we are mindful of a home-front struggle which also must culminate in freedom—freedom from the threat of infantile paralysis to future generations of American.

During the past twelve years the American people have come more and more to identify your birthday with their battle against infantile paralysis. Therefore, I sincerely hope that again next January you will permit the use of your birthday by The National Foundation for Infantile Paralysis in connection with its Annual Fund-Raising Appeal.

Not since 1916 has the nation been attacked so severely by infantile paralysis in epidemic force. Already this year over 18,000 people have felt the dread touch of this disease.

This second largest epidemic of infantile paralysis in the history of this country did not, however, catch our people unprepared, because the dollars and dimes contributed voluntarily by the American people enabled their National Foundation to put into the 1944 epidemic field more trained doctors, physical therapy technicians and nurses than have ever before been added to the roster of infantile paralysis fighters in this or any other country. Due in large part to this fact, far more than half of those whom infantile paralysis struck down this year will again be going about their tasks with faith and hope and confidence, because their fellow Americans have made it possible. Further, while everyone afflicted by infantile paralysis is assured the best of medical care and treatment, at the same time there is going on a vast program of research to find a preventive and cure of this disease.

Unremitting research will provide the key which will unlock the door to victory over infantile paralysis. The fashioning of this key takes time and money and the talents of a host of eminent scientists. That work is going on constantly—supported by National Foundation grants operative in more than fifty institutions throughout the country; that work is going on by virtue of the mandate of the American people who, aware of the threat of recurrent epidemics, are resolved that this disease must be conquered.

Almost $7,000,000 has been expended thus far by the National Foundation for grants in research, epidemic aid and education. That amount is, of course, in addition to the sums spent by our Chapters to render immediate and direct aid to those stricken regardless of age, race, creed or color. The way in which these Chapters spring into action in times of stress was never depicted more graphically than in this most recent epidemic. Vital hospital facilities were created almost overnight; personnel, supplies and equipment were rushed to epidemic areas with rapidity because the network of Chapters was ready for the attack of the Crippler from whichever direction it might come.

This home-front fight must be intensified. The greeting "Happy Birthday!" has taken on new significance for this nation because your natal day has been dedicated to brighten the lives and extend the horizon of hope for those who suffer from a terrible disease. I trust that once again on January 30th we may reaffirm to all that the fight against infantile paralysis continues relentlessly.

Faithfully yours,
Signed: BASIL O'CONNOR,
President.

December 1, 1944.

Dear Basil:

I gladly grant your request for the use of my birthday again in the fight against infantile paralysis and I am proud that it has been used these many times by the National Foundation to serve so worthy a purpose.

For two successive years the American people, at war abroad, have had to combat infantile paralysis in epidemic form at home. As you say, the 1944 epidemic was the worst the nation has experienced since 1916. But unlike that year—when the whole eastern seaboard was ravaged by the disease—the people now are armed with a powerful weapon with which to meet the onslaught of the foe.

The work of The National Foundation for Infantile Paralysis and its Chapters glows as one of the brightest pages in the history of how a nation of free people, working together, seeks to assure for its children the priceless gift of health.

It is good to know that while the infantile paralysis casualties of 1944 and former years are receiving the aid they need, there is going on apace an ever-expanding program of research seeking the prevention and cure of the disease. I feel as you do that the value of this research cannot be over-emphasized. Treatment, no matter how adequate, cannot win this war against a disease aggressor; but scientific research put in motion by the American people through their support of the National Foundation will unquestionably conquer this disease.

We face formidable enemies at home and abroad. Victory is achieved only at great cost—but victory is imperative on all fronts. Not until

we have removed the shadow of the Crippler from the future of every child can we furl the flags of battle and still the trumpets of attack. The fight against infantile paralysis is a fight to the finish, and the terms are unconditional surrender.

Sincerely yours,

Signed: FRANKLIN D. ROOSEVELT.

Mr. Basil O'Connor,
President, The National Foundation for Infantile Paralysis,
120 Broadway,
New York City.

Misbranded Products

Abstracts of Notices of Judgment issued by the Food and Drug Administration of Federal Security Agency.

[Editorial Note.—These Notices of Judgment are issued under the Food, Drug and Cosmetic Act, and in cases in which they refer to drugs and devices they are designated D. D. N. J. and foods, F. N. J. The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the date of shipment; (4) the composition; (5) the type of nostrum; (6) the reason for the charge of misbranding, and (7) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Armi Mineral Water. — Ralph R. Markwood, trading as Armi Mineral Water Company, Toledo, Ohio. Shipped July 2 and August 15, 1940. Substantial amounts of sodium sulfate and lime, not more than 0.15 grain of silicon dioxide per quart (declared an insignificant quantity present in many city water supplies) and only traces of, if any, potassium diphosphate, manganese and potassium chloride, magnesium, calcium, sodium and ferric phosphates, potassium iodide or lithium bromide. Misbranded because label falsely represented product to contain important and substantial amounts of the substances in the last-named group. Also misbranded because label did not give the common or usual name of each active ingredient, since one of them was slaked lime, which label listed as calcium hydroxide. Further misbranded because label did not so list ingredients as to make them understood by the ordinary individual, with the exception of lime and sodium sulfate, which were present, if at all, in unimportant and inconsequential proportions. Misbranded again because of misleading zigzag design on label depicting lightning, and because the statement "Treated by Electrolysis" failed to reveal that any treatment by electrolysis to which the article may have been subjected had not affected its properties. Misbranded, finally, because label claim, "Scientifically Balanced," was false and misleading when applied to water to which had been added small amounts of lime and sodium sulfate and inconsequential amounts of other substances. — [D. D. N. J., F. D. C. 777; September 1943, J. A. M. A. **126**:514 (Oct 21) 1944.]

Rehabilitation News

On November 1 to 4 a meeting of the National Rehabilitation Association was held in Chicago, following a conference called by the Federal Office of Vocational Rehabilitation, with the state directors of rehabilitation bureaus and state agencies for the blind.

The Rehabilitation Center of the Liberty Mutual Insurance Company, Boston, Massachusetts is described in detail in Restoring Injured Workers, an illustrated pamphlet of twenty pages. This publication may be obtained, on request, from the company.

War Veterans Reinstatement Plan, a manual issued by the Westinghouse Electric & Manufacturing Company and Subsidiary Companies, Pittsburgh, Pennsylvania, contains information based on existing Federal Laws and Company policies. Some of the subjects discussed in this manual are: classification of men and women from the service; temporary employees; government provisions; organizing to meet the need; reinstatement plan; government benefits and privileges for veterans, and government agencies assisting war veteran rehabilitation.

General Lull Dedicates Vaughan Hospital

At special ceremonies held in Hines, Ill., Major General George F. Lull, U. S. A., Deputy Surgeon General, dedicated Vaughan General Hospital, which will specialize in medicine and psychiatry.

Colonel Victor Clarence Vaughan, in whose memory the hospital has been named, was one of the leading bacteriologists and toxicologists of his day. He was commissioned a Major in the U. S. Army during the Spanish-American War and was a member of the commission headed by Walter Reed to study the cause and prevention of typhoid fever, then epidemic in military camps.

During the World War, Colonel Vaughan served in the Office of The Surgeon General and was on the executive committee of the general medical board of the Council of National Defense. He served as president of the American Medical Association and of the American Tuberculosis Association. He was awarded the Distinguished Service Medal for his outstanding work in epidemiology and was made a Knight of the Legion of Honor by the French government. He died in 1929.

Correction

The following references should have appeared with the article in the November ARCHIVES, "A Comprehensive Rehabilitation Center," by Walter J. Zeiter, M.D.; Shelby Gamble, M.D., and Bell Greve.

1. Wright, H. R., and MacDonald, M.D.: Staff Needs in Vocational Rehabilitation Services, Social Service Rev. **18**:2 (June) 1944.
2. Manual of Occupational Therapy, Chicago, American Medical Association, 1943.
3. Report of the Baruch Committee on Physical Medicine, New York, April, 1944.
4. Bishop, A.: Personal communication to the author.

BOOK REVIEWS

MICROBES THAT CRIPPLE. Written and illustrated under the direction of *Edward L. Compere*, M.D. Edited by *T. Arthur Turenr*. Cloth. Pp. 241. Price, $2.50. Elyria, Ohio: The National Society for Crippled Children, Inc., 1944.

There is a tremendous interest of the intelligent layman in crippling and its causes and physicians are constantly asked questions in this field. Here is a book to answer these questions. This book gives a valid and organized idea of the relation of pathogenic micro-organisms to human deformity. It is not in the class of "miracle literature" but it does not bore the reader. It gives interesting facts rather than melodrama. The illustrations form a high point in the book, many are schematic but all are interesting, entertaining and explanatory of the text. For instance, the evolution of the microscope and the story of Semmelweis and childbed fever are shown on one page each by small drawings.

The first chapters are on microbiology. That this book furnishes physicians material that they can use in answer to patients' questions is shown in the titles of some subjects considered: the berry (alias cocci) family; bacilli (little sticks) microbes with oars; bacterial corkscrews; the spiralla; bacteriophage, the plague of microbes; microbes in disguise, dissociation; Metchnikoff's Starfish, the phagocytes; and cooperative commandos, antibodies.

Many interesting facts are given in the chapters considering specific causes of crippling. For instance, in 1940 osteomyelitis outranked tuberculosis as a crippling cause on the total state registers of crippled children. The chapter titles give an indication of the humorous, ironical and interesting content of the book: microbes and maggotts—pyogenic osteomyelitis; microscopic toughie—the tubercle bacilli; spirochoeta with a record; poliomyelitis and the virus cripplers; the chain gang — hemolytic streptococcus describing rheumatic fever; bacterial free-for-all giving facts on the five general varieties of arthritis: infectious, rheumatoid, osteo—or degenerative, traumatic and gout; accessories before the fact (measles, whooping cough and influenza); the story of chemotherapy discussing cocci's curse—the sulfonamides, and the penicillin—amber elixir; and public hygiene and the prevention of crippling.

This monograph can be recommended to physicians to have in their office library, as it gives in an understandable language, answers that patients frequently ask. Although this volume digs a little deeper than the average popular work, it is of particular interest and value to persons interested in the problem of the crippled, especially the parents and teachers of crippled children, the rehabilitation worker, physical therapists, occupational therapists, social service workers, nurses and members of hospital boards who are interested in crippled children's work.

PATHOLOGY AND THERAPY OF RHEUMATIC FEVER. By *Leopold Lichtwitz*, M.D. Lately chief of the Medical Division of the Montefiore Hospital, and Clinical Professor of Medicine, Columbia University, New York City. Foreword by *William J. Maloney*, M.D., LL.D., F.R.S. (Edin.), Consulting Neurologist to the City Hospital; Formerly Professor of Nervous and Mental Disease, Fordham University, New York City. Edited by Major *William Chester*, M.C. Cloth. Pp. 210 with 69 illustrations. Price, $4.75. New York: Grune and Stratton, 1944.

This is an interesting posthumous volume, which, although entitled "Pathology and Therapy of Rheumatic Fever" also contains discussions of several other conditions usually classified in the rheumatic group. The foreword by Doctor Maloney is both instructive and entertaining. The illustrations, both photographs and photomicrographs, are good.

The author has developed the argument for the allergic nature of rheumatic fever in a convincing manner. His discussion of "nonrheumatic chronic arthritis," however, is somewhat confusing since he has made no clearcut distinction between rheumatoid and osteoarthritis, the recognized classification of the chronic arthritides. Chapters have been devoted to rheumatic myositis, rheumatic manifestations in the skin, rheumatic lesions in the nervous system and rheumatic involvement of such miscellaneous organs as the eye, the respiratory tract, the gastrointestinal tract, the kidneys and the lymph glands and spleen.

In the chapter on therapy, the treatment of rheumatic fever is considered in conjunction with that of the chronic arthritides. Here again the distinction is not clearcut. The prevention of rheumatic fever consists in the avoidance and energetic treatment of throat infections and the removal of obvious foci. The salicylates are still the most useful drugs in the management of this disease. The author considered the complications of gold therapy in arthritis to be too serious to permit its general use, especially since its value as a curative agent had not been conclusively demonstrated. Among the physical measures advocated in the treatment of rheumatic disease are various types of local heat, sunlight and artificial ultraviolet radiation. The author, like some others unfamiliar with it, considered artificial fever therapy too dangerous to be employed in the rheumatic diseases and rightly advised that this treatment should be given only by those expert in its use.

This volume contains much valuable material

and should be read especially for its discussion of the allergic nature of rheumatic fever. The book would doubtless have been improved if the author had adhered strictly to his main theme, rheumatic fever.

SYMPTOMS OF VISCERAL DISEASE. A STUDY OF THE VEGETATIVE NERVOUS SYSTEM IN ITS RELATIONSHIP TO CLINICAL MEDICINE. By *Francis Marion Pottenger,* A. M., M.D., LL.D., F.A.C.P. Medical Director, Pottenger Sanatorium and Clinic for Diseases of the Chest, Monrovia, California; Professor Emeritus of Clinical Medicine, University of Southern California. Sixth Edition. Cloth. Pp. 442 with 97 illustrations. Price, $5.00. St. Louis: The C. V. Mosby Company, 1944.

The fact that a sixth edition of this book is necessary is an indication of an ever-growing interest in visceral neurology. In this monograph the author interprets so far as may be possible in terms of visceral neurology, symptoms which are found in everyday clinical observations of visceral disease. Clinicians are always dealing with symptoms. Some, they can readily interpret; others, they are forced to admit are beyond their understanding. Many of the most difficult symptoms to explain are of a reflex nature. The clinician's failure to understand is often not because the cause is not known to physiology but because physiology and the clinic are too widely separated.

The book is a study of visceral disease not from the standpoint of the disease process, important as that is, but from the no less important standpoint of the patient who has the disease. It shows how pathologic changes in one organ affect other organs and the organism as a whole, through the medium of the visceral nerves. In contradistinction to the usual treatment of disease processes in their pathologic anatomic relationships, this is a study in pathologic physiology. It is largely a discussion of viscerogenic reflexes; and, as such causes us to examine somewhat carefully the problems connected with the vegetative nervous system. It shows the importance of careful clinical observation and analysis.

The idea of the viscerogenic reflex is developed more fully than is usual, and the parasympathetic reflexes are given as much attention as those of sympathetic origin. The importance of the viscerotrophic reflex is also emphasized.

The monograph is arranged in three parts: (1) the vegetative nervous system; (2) the relationship between the vegetative nervous system and the symptoms of visceral disease; and (3) the innervation of important viscera with a clinical study of the more important viscerogenic reflexes.

The practice of medicine is a continuous attempt on the part of the physician to understand the manner in which the patient expresses disease through his physiologic systems. This book is preeminently a discussion of man as a segmented organism. On the one hand, it describes visceral and somatic relationships to neurons which take origin in the various segments of the cord, and, on the other hand, it describes the reflexes which result from this association. Reflex spasms, pains (referred pain), and the degenerations are described and assigned to the various neurons which mediate impulses from inflamed and irritated viscera. Physiologic reflexes do not shift, so if the clinician knows his segmental relationships, he can reason from organ to the zone of the reflex or from the zone of the reflex back to the organ.

While the importance of reflexes is emphasized throughout the book, the author shows that man is a unit, acted on by many forces — some physical, some psychical, some physiologic, some pathologic — which determine and alter nerve reaction, thus making for variability of symptoms. It is a book that can be read with profit by every physician.

AVIATION MEDICINE. By *Harry G. Armstrong,* M.D., Colonel, Medical Corps, United States Army. Second edition. Cloth. Pp. 514 with illustrations. Price, $6.50. Baltimore: The Williams & Wilkins Company, 1943.

The author stated in the preface of the first edition of this book that it was intended as a textbook for students and as a reference book for those actively engaged in the practice of aviation medicine. The author made an effort to satisfy the great demand for condensed information on this subject, derived from various sources, deleting to a minimum highly technical terminology.

The first edition was well received and aroused such widespread interest in aviation medicine in the United States that the author deemed it necessary to prepare a second edition incorporating such new material as was available. Much of the recent information relative to aviation medicine is classified as confidential and, therefore, it will not be available for publication until after the war. The purpose, scope and arrangement of subject matter in the second edition is the same as in the first edition although certain chapters were thoroughly revised. Known errors were eliminated. Some of the material which was the subject of controversy or speculation at the time of publication of the first edition was clarified or modified for the present edition as much as possible in view of limitations imposed by the war.

The contents of the book are arranged in the following order: 1. The history of aviation medicine from the First World War up to the present time is outlined. 2. The duties of a flight surgeon and the evolution of medical examinations and tests necessary for selecting pilots are discussed. The various types of procedures in the examination of the cardiovascular system, eye, ear, nose and throat; in physical and neuropsychic examinations and in the general care of the flyer are described in detail. 3. Noxious substances that may affect the aviator, physical factors in flight, aerial equilibration and orientation, air sickness, anoxia, chronic altitude sickness, oxygen in aviation, mechanical effects of decreased atmospheric pressures, aero-embolism, sealed high altitude aircraft enclosures, speed and acceleration, accidents in aviation, emotional reactions to flight, protective flying equipment, and aerial relief and sanitation are discussed.

The book is well written and adequately documented. Since all phases of aviation medicine are included, it should prove interesting to the student, to the medical officer and to the physician in civilian practice who examines pilots.

AN INTRODUCTION TO PUBLIC HEALTH. By *Harry S. Mustard*, B.S., M.D., LL.D., Director and Professor of Public Health Practice, Delamar Institute of Public Health, College of Physicians and Surgeons, Columbia University, New York City, New York. Second Edition. Price, $3.25. New York: The MacMillan Company, 1944.

The second edition of this work has been expanded and brought up-to-date. After the introductory chapters on the background and associations of public health work, its organization and administration, and on the latest available figures on morbidity and mortality, the succession of chapters presents: The Acute Communicable Diseases, Tuberculosis as a Public Health Problem, The Venereal Diseases, Sanitation, Industrial Hygiene, The Individual and His Hygiene, Childbearing and Its Relation to the Public Health, The Hygiene of Infancy and Young Childhood, School Health Service, Public Health Aspects of Certain Non-Communicable Diseases, Medical Care and Public Health. This volume offers a clearly written and authoritative exposition of the problems and practices in the field of public health, equally suitable as a text on introductory courses on public health, as well as a welcome source of orientation to physicians, dentists, and nurses.

THE ANALYSIS AND INTERPRETATION OF SYMPTOMS. Edited by *Cyril M. MacBryde*, M.D. Cloth. Pp. 301, with numerous graphs and tables. Price, $4.00. Philadelphia: J. B. Lippincott Company, 1944.

This is a small monograph to which a number of well-known authors have contributed. In the introduction the editor, Dr. MacBryde, pointed out that "monographic development, the complete picture of disease, is an important means of medical education, but that there are serious defects in the system which encourages medical men to force any patient into a compartment no matter how poorly it may fit him." He further pointed out that a skillful analysis of the history, chief complaints and course of illness often will indicate the probable diagnosis to the experienced physician before the physical examination or the laboratory tests are done. The articles presented in this small monograph give the basis for further analysis and interpretation of the common symptoms that bring patients to physicians. The authors place emphasis on the pathologic physiology and symptoms. It is the belief of the editor that knowledge, concerning many of these symptoms, is incomplete although it is rapidly expanding.

Chapters are on the following subjects: nervousness and fatigue; fever; headache — mechanisms and differential diagnosis; thoracic pain; the differential diagnosis of the conditions which produce cough and hemoptysis; abdominal pain; hematemesis and melana; jaundice; joint pain and obesity. In each chapter the physiology or pathologic physiology of the various symptoms, including the neurogenic relationship, is outlined. Discussions are basic and most of the recent material relative to the various subjects discussed is presented in the bibliography at the end of each chapter.

Two chapters may be of special interest to the physician who is interested in physical medicine: one is on fever; the other one on joint pain. In the former the mechanism and cause of fever and regulation of bodily temperature are discussed. The chapter on joint pain may be of considerable interest to physicians interested in rheumatic diseases and orthopedics as well as to those interested in physical medicine. All the chapters are well written and the material presented is up to date. The book should be a valuable reference for any practicing physician.

THEORY OF OCCUPATIONAL THERAPY. By *Norah A. Haworth*, M.A. (Cantab.), M.R.C.S., L.R.C.P., D.P.M., Assistant Medical Officer, London Passenger Transport Board, late Medical Officer, Horton Emergency Hospital and Senior Assistant Medical Officer, Severalls Mental Hospital, Colchester, and *E Mary Macdonald*, Principal Dorset House School of Occupational Therapy, Barnsley Hall Emergency Hospital, Bromsgrove, with Foreword by Sir *Robert Stanton Woods*, M.D., F.R.C.P., Consultant Adviser in the Physical Medicine to the Ministry of Health, Physician in charge of the Department of Physical Medicine at the London Hospital. Second Edition. Cloth. Pp. 148, illustrated. Price, $2.50. London: Bailliere, Tindall & Cox, 1944.

This book is concerned with the use of occupation in rehabilitation. The authors believe that the enlistment of physical means in maintaining the health of body, mind and spirit and its reestablishment when impaired, involves a consideration of three mutually complementary groups of physical agents, such as the passive agents of massage, electricity and thermotherapy, educational and remedial exercise and activity at some productive occupation. Each of these agents has its place in rehabilitation and although in many instances and at certain stages, passive therapy is the only kind that can be employed, the aim in rehabilitation is to introduce the more active forms as early as conditions will allow.

Sir Robert Woods in his foreword states two truths that are beginning to be recognized in this country: (1) "Recovery of an injured limb, as well as recovery from the distorted outlook engendered by the injury, receive a considerable impetus from active use of the limb, a greater impetus still from employment which is productive, but proceed most rapidly of all after the individual has been able to resume his original occupation and is earning wages at this;" (2) "The neglect in the

past of productive work as a part of the treatment of physical abnormalities is a grave reflection not only upon the medical profession but also upon the lack of vision displayed by industrial employers and insurance companies."

This second edition has been completely revised. This book can be highly recommended to occupational therapists and to students of occupational therapy.

VENTURES IN SCIENCE OF A COUNTRY SURGEON. By *Arthur E. Hertzler,* M.D., Halstead, Kansas. Cloth, illustrated. Pp. 304. Halstead, Kan., The Author, 1944.

This monograph is by the author of "The Horse and Buggy Doctor." The author of this book became widely known but it will be a surprise to those who are not surgeons how many other books Dr. Hertzler has written about surgery and surgical pathology. He shows in this book that the fundamental sciences are not only necessary as a foundation for clinical medicine but are an unending source of fun and unless pathology is made a game one will never follow it. "As a duty it is too painful."

This book, near its end, has two chapters on Troubles Sought For and on The Writing of Books, both humorous and good, especially telling of his experiences with the hospital inspector of the American College of Surgeons and how a paper on goiter was refused publication in *The Journal of The American Medical Association.* He says: "Despite the above kick in the face, my exhibit on goiters proclaiming the correctness of total thyroidectomy appeared in the exhibit room of the Society in 1942." In another place Dr. Hertzler says: "So I am still in the dog house. My next mention in *The Journal* will be at some undetermined date—Doc. Pest Died—cause senility."

This book should be read by young country doctors for it tells them how much fun one can get out of the pursuit of the science of medicine in simple surroundings, neither helped nor hindered by great universities.

Discussion of Paper by Captain E. W. Fowlks

(*Continued from Page 737*)

for World War I and prior war veterans honorably discharged with any disability or disease, when hospital treatment was indicated, therefore many persons with acute and subacute diseases and injuries were constantly being admitted for treatment throughout the Veterans facilities. Now with the World War II Veterans being admitted for treatment in rapidly increasing numbers daily, our resources of physical medicine because of the more serious types of injuries and more complicating diseases seen in the young men and women veterans of this war, will demand more attention, and more responsibility must be assumed for their rapid and full physical rehabilitation.

The author has outlined in detail the physical methods employed in a variety of injuries and disease processes, in patients admitted to a general medical and surgical facility. In the treatment and management of the various pathologic conditions, the point has been stressed that a patient should be treated individually and not as a pathologic group in order to achieve best end results.

The purpose of prompt and adequate treatment by employment of properly combined physical modalities is to reduce the period of hospitalization days and yet at the same time fully to rehabilitate a veteran to enable him to pursue a gainful occupation or to enter on a suitable vocational program in the minimum of time.

The application of properly chosen physical measures should always be given along with other indicated procedures, as the author has pointed out in the treatment of the person with multiple acute articular arthritis. The other types of cases reported show that physical medicine was not employed to the exclusion of indicated symptomatic, supportive, surgical and orthopedic procedures. All these combined efforts together with remedial and reeducational supervised exercises with prescribed psychotherapy and occupational therapy, when indicated, will result in restoration of function and physically rehabilitate the disabled to become useful citizens.

Physical medicine has a wide range of usefulness in a general Veterans Administration Facility, as shown by the results obtained in the cases reported and the treatment outlined and the author is to be commended on his paper.

PHYSICAL THERAPY ABSTRACTS

A Reconditioning Program for Disabled Soldiers. Harold C. Lueth.

Illinois M. J. **86**:96 (Aug.) 1944.

Maximal utilization of the nation's manpower is of vital concern to everyone. With the realization that the manpower resources of the country are limited and an awareness of the tasks of total war, every effort must be made to garner the total resources of manpower. A sound realistic approach to the problem has already been put into execution at several large general hospitals.

A practical scientific program for the reconditioning of disabled soldiers has recently been put into operation in all army hospitals, by the Surgeon General. It is designed to return sick and injured men to full duty at the earliest practicable time, thus conserving the trained manpower of the nation. The program includes physical, mental and emotional reconditioning. Physical exercises are begun as early as possible and in many instances they are started while the patient is in bed. The ward medical officer prescribes the physical training and specifies when it can be begun and the amount to be given. The basis of physical reconditioning rests on a graduated system of calisthenics, drills, sports and military training. Coincident with physical reconditioning, mental and emotional reconditioning are conducted by specially trained officers and enlisted men. Early results of the new program indicate that soldiers are returned to full duty much earlier than under previous plans. The ultimate success of the plan rests with the individual medical officer, for he must determine how and when reconditioning must be conducted, in keeping with accepted scientific practice.

The Physiological Effects of High Temperatures. W. Machle.

Mil. Surgeon **95**:105 (Aug.) 1944.

In this global war the soldier often encounters two enemies; one his human adversary, the other his environment. In some theaters of operation the environment has proven to be the more disabling opponent. The effects of environment on our fighting men has occupied the attention of a considerable portion of the staff of the Army Ground Forces Medical Research Laboratory, Fort Knox, Kentucky. Studies have been carried out in the Laboratory Hot Room in simulated desert (hot, dry) and simulated jungle (hot, humid) environments.

These studies offer a physiologic basis for the handling of troops in hot environments. Men cannot be expected to perform effectively and efficiently on first exposure to hot environments. At this time basic and fundamental physiologic disturbances induced by the heat render men relatively unfit and incapable of hard work. No amount of previous training and physical conditioning in cool environments can prevent these physiologic changes. It is necessary to acclimatize men in the hot environment by graded exposure and progressively increasing work. With judicious handling one week suffices to acclimatize most men and make them fit for hard and efficient work in the heat. The emphasis should still be on physical fitness for after the initial period is past and men have become acclimatized it is the fit man who is capable of the greatest and most efficient work in the heat just as in the cool environments.

The factors affecting the performance of the fit acclimatized man in hot environments are the same as those affecting his performance in cool environments. Because of the added load of the environment work and performance will suffer more easily and more severely in the hot environments than in cool ones. Hence adequate food and above all adequate water and salt are essential for continued good performance in hot environments. In hot environments man always sweats a great deal and loses much water and salt whether that sweating is visible or not. Replenishment of the salt and water losses are absolutely essential for continuance of work in the heat. If they are not restored even the most fit and well acclimatized man is rendered totally unfit and a casualty. Man cannot be hardened to work in the heat with curtailed water and salt intake because it is physiologically impossible for him to train his sweat glands to secrete less salt and water.

The Hyperpnea of Muscular Exercise. Julius H. Comroe, Jr.

Physiol. Rev. **24**:333 (July) 1944.

The history of respiratory physiology for the last sixty years has been a succession of attempts to explain all deviations from normal respiration by one theory, whether it is regulation by oxygen content of the arterial blood, by alveolar or arterial CO_2 tension, by arterial blood pH, or by acidity of the interior of the cells of the respiratory center. No one theory can account for all of the hyperpnea of muscular exercise.

Among the earliest explanations proposed for the control of respiration was that of Volkmann in 1841 and Vierordt in 1844, who believed that respiration was regulated chiefly by means of reflexes. In the intervening years all theories dealing with the control of respiration were concerned chiefly with the dominant effect of chemical substances acting directly on the medullary

centers. Probably the most important discovery of the last century, has been the realization that respiration is controlled not by reflexes alone, not by chemical stimulation of the medulla alone, but by the proper interaction of both factors. No reflex can stimulate respiration if the arterial CO_2 tension has been lowered abnormally; no chemical stimulant can produce rhythmic breathing if the medullary centers have been completely cut off from all nervous influences.

Medical Social Work and Vocational Rehabilitation. Irene E. Morris.

Hosp. Progr. **25**:199 (July) 1944.

According to the natural law man has a right to life, liberty and the pursuit of happiness; and, in order to maintain life, he must have the essentials with which to support life. Therefore, admittedly in our present culture he must have an occupation, trade, or profession from which he receives financial returns which will enable him to maintain himself and his family according to the standard of living common to the group of which he is a member.

The person known to us as physically handicapped by disease or crippling condition has the same right to gainful occupation as one not so disabled. The term "handicapped" as used by the author refers to one who is encumbered with a physical disadvantage which renders success in life difficult to attain.

The preparation for or restoration to gainful occupation of the handicapped or disabled is the objective of vocational rehabilitation. This term is used to cover any services necessary to render a disabled person employable or more advantageously employable, services being limited to those with physical conditions that are not progressive and that constitute a handicap to some form of employment.

Post-Traumatic Pain and the Causalgic Syndrome. J. Doupe; C. H. Cullen, and G. Q. Chance.

J. Neurol. & Psychiat. **7**:48 (Jan.-Apr.) 1944.

It is not uncommon, especially in wartime, to be faced by patients complaining of persistant severe pain in the hand or foot following an injury to a limb, despite the absence of apparent cause. Cases in which post-traumatic pain arises from tender neuromata or obvious vascular abnormalities are not discussed.

According to the authors it was noted that there was a need for a clearer definition of post-traumatic pain. An attempt is made to define the causalgic syndrome, using as a basis a theory of the mechanism of production of the symptoms. The peculiar qualities of causalgic pain are ascribed to stimulation of sensory fibers by efferent impulses in the sympathetic fibers. Evidence in favor of such a linkage was obtained from a study of the reactions to a variety of stimuli and from the results of peripheral nerve, nerve root and sympathetic chain block. Two types of causalgic syndrome are described depending on whether the site of conjunction of the sympathetic and sensory fibers was proximal, at the site of the nerve lesion or distal, near the terminations of the fibers.

It was considered possible that the distal type could occur as a result of some disturbance of metabolism due to edema, ischemia, or some other factor determined by injury to the limb as opposed to a primary injury to the nerve trunk.

A series of cases exhibiting post-traumatic pain was reported and these were grouped under the terms of psychogenic causalgic and dystrophic.

Comment was made on the vascular and nutritional changes with particular reference to osteoporosis. This reaction was considered to be non-specific and it was shown to occur independently of the peripheral nervous system.

Physiological Aspects of Physical Therapy and Rehabilitation. Ora L. Huddleston.

Federation Proc. **3**:254 (Sept.) 1944.

Physical medicine always has participated in the rehabilitation of the sick and the disabled. At the present time it constitutes an integral part of practically all rehabilitation programs. Its importance in the treatment of wounded soldiers and veterans was fully appreciated by the medical profession during and following the last war. Marked advances were made in the treatment of wounds and injuries by the application of the physical medicine principles. Many of these principles were employed in definitive therapeutics and were further utilized during the period of convalescence. The use of such principles contributed to the establishment of maximum physical and psychologic benefits which, when combined with supplemental vocational or professional training, qualified the person to resume his economic and social responsibilities as a citizen in civilian society. The earlier advances of physical therapy have been maintained somewhat since that time but probably not to the high degree of development obtained at the close of the last war. New interest and an even greater appreciation of these principles have developed during the current conflict.

It is believed that physical medicine can participate effectively in rehabilitation utilizing the following procedures: 1, institute physical therapy as soon as possible; 2, treat the person as a whole which means treating the psychologic aspects of the patient's disabilities as well as the physiologic and pathologic processes; 3, in prescribing physical therapy, make use of principles which are based on physiologic reactions of the body and outline a treatment program which is best suited to correct the individual and collective abnormalities of the person; 4, coordinate and integrate the program of physical therapy with other types of treatment. When the above mentioned procedures are followed, physical medicine will contribute maximum service to the rehabilitation of the person.

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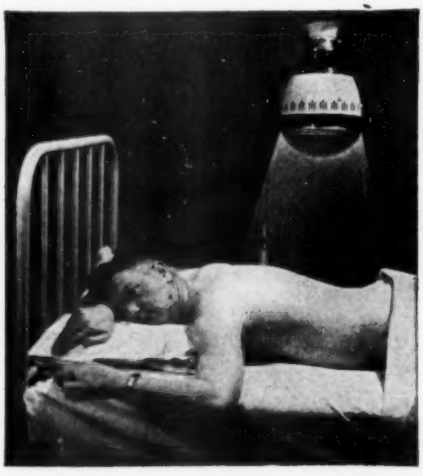

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			Entrance Requirements*	Length in Months	Classes Start	Tuition	Certificate, Diploma, Degree	Length in Months	Classes Start	Tuition	Certificate, Diploma, Degree
Children's Hospital, Los Angeles	Samuel S. Mathews	Lily H. Graham	a-b-c	6	FebAug	$200	Certificate	12	FebAug	$200	Diploma
College of Medical Evangelists, Los Angeles[1]	Fred B. Moor	A. H. Carlson	a-b-c	....	.....	.....	.....	12	JanJuly	$215	Certificate
University of California Hospital, San Francisco[1]	Frances Baker	Margery L. Wagner	a-b	....	.....	.....	.....	12	MarOct	$150	Certificate
Stanford University, Stanford University, Calif.[1]	Wm. H. Northway	Catherine Worthingham	a-b-d[2]	7	Quarterly	$286	Certificate	10	Quarterly	$409	Cert. or Degree
Fitzsimons General Hospital, Denver	Ora L. Huddleston, Maj., MC	Harriet S. Lee, Lt.	†	6	FebAug	None	Certificate	....	.....	.....	.....
Walter Reed General Hospital, Washington, D. C.	Donald L. Rose, Maj., MC	Evelyn L. MacDonald, Capt. PTA	†	6	Quarterly	None	Certificate	....	.....	.....	.....
Northwestern University Medical School, Chicago	John S. Coulter	Gertrude Beard	a-b-c	....	.....	.....	.....	9	JulyOct	$200	Certificate
State University of Iowa Medical School, Iowa City	W. D. Paul	Olive Farr	b-c	6	MarSept	None	Certificate	9	MarSept	None	Certificate
Bouvé-Boston School of Physical Education, Boston	Arthur L. Watkins	Constance K. Greene	a-b-c[3]	6	June	$250	Certificate	3-4 yrs.	Sept	$400 yr.	Dipl. or Degree
Harvard Medical School, Boston	Frank R. Ober	Janet B. Merrill	a-b-c	6	MarSept	$250	Certificate	9	MarSept	$300	Certificate
Boston University Sargent College of Physical Education, Cambridge, Mass.	Louis Howard	Lucille W. Fuller	a-b-c	(Given in conjunction with Harvard)				19	Oct	$435 yr.	Cert. & Degree
University of Minnesota, Minneapolis[1]	Miland E. Knapp	Sara E. Kollman	a-b-c[4]	....	.....	.....	.....	12	Mar.	$168[5]	Certificate
Mayo Clinic, Rochester, Minn.[1]	Frank H. Krusen	Carl O. Moe	a-b-c	6	JanJuly	None	Certificate	9	JanJuly	None	Certificate
Barnes Hospital, St. Louis	F. H. Ewerhardt	Beatrice F. Schulz	a-b-c	....	.....	.....	.....	9	Oct	$200	Certificate
St. Louis University School of Nursing St. Louis[1]	Alex. J. Kotkis	Sr. M. Imelda	a-b-c[3]	8	JanSept	$250	Certificate	4 yrs.	JanSept	$250 yr.	Cert. & Degree
O'Reilly General Hospital, Springfield, Mo.	.....	Ethel M. Theilmann, Capt. PTA	†	6	JanJuly	None	Certificate	....	.....	.....	.....
Columbia University, New York City	Wm. B. Snow	Josephine Rathbone	a-b-c	....	.....	.....	.....	10	FebSept	$390	Certificate
Hospital for Special Surgery, New York City[1]	K. G. Hansson	Ethel M. Willmer	a-b-c	6	Jan	$200	Diploma	9	Sept	$300	Diploma
New York University School of Education, New York City[1]	Geo. G. Deaver	Paula Blackman	a-b-c	....	.....	.....	.....	9	FebSept	$432	Cert. or Degree
Duke University School of Medicine, Durham, N. C.[1]	Lenox Baker	Helen Kaiser	a-b-c	....	.....	.....	.....	12	OctApr	$200	Certificate
Cleveland Clinic Foundation Hospital, Cleveland	Walter J. Zeiter	Anna Wetterhuus	a-b-c	....	.....	.....	.....	9	Sept	None	Certificate
D. T. Watson School of Physiotherapy, Leetsdale, Pa.[1]	Jessie Wright	Kathryn Kelley	a-b-c	6	AprOct	$200	Diploma	12	Oct	$200	Diploma
Graduate Hosp. of the Univ. of Penn., Philadelphia[1]	Wm. T. Johnson	Samuel M. Henshaw	a-b-c	....	.....	.....	.....	12	JanSept	$200	Certificate
University of Texas School of Medicine, Galveston	G. W. N. Eggers	Billie L. Crook	a-b[6]	....	.....	.....	.....	9	JanMarJuly	$130[5]	Certificate
Brooke General Hospital, San Antonio, Texas	A. O. Loiselle, Maj. MC	Elsie Kuraner, Capt. PTA	†	6	JanJulyOct	None	Certificate	....	.....	.....	.....
Richmond Professional Institute, Richmond, Va.	T. F. Wheeldon	Erma Cannon	a-d[6]	6	Sept	$200[5]	Certificate	9-12	Sept	$200[5]	Cert. & Degree
University of Wisconsin Medical School, Madison[1]	Elizabeth Grimm	Margaret A. Kohli	a-b-c[8]	....	.....	.....	.....	9	Sept	$96[5]	Certificate

* Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses.

† For complete information regarding entrance to Army training schools write to Major Emma E. Vogel, Director of Physical Therapy Aides, Office of the Surgeon General, War Department, Washington, D. C.

1. Male students admitted.
2. High school graduates accepted for four-year course leading to A.B. degree; students admitted quarterly and tuition is $143 per quarter.
3. High school graduates admitted to regular course.
4. Medical technology graduates with B.S. degree also admitted.
5. Non-residents charged additional fee.
6. Those with degree from any accredited college also accepted.
7. Students with two years of college admitted to emergency course only.
8. 60 college credits, including a course in Zoology (biology) and one in Physics.

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University of Kansas, Lawrence	University of Kansas	4 yrs.	Every semester	High Sch.	Univ. fees	Degree	None
Boston School of Occupational Therapy, 7 Harcourt St., Boston	None	28 mos.	JulyOct	1 yr. coll.	$300	Diploma	27
Kalamazoo State Hospital School of Occupational Therapy, Kalamazoo, Mich.	Western Michigan College of Education	25 mos.	MarNov	1 yr. coll.	Coll. fees	Dipl. & B. S.	15
Michigan State Normal College, Ypsilanti	Michigan State Normal College and University of Michigan	3-4 yrs.	Every semester	High Sch.	$67	Dipl. & Degree	None
St. Louis School of Occupational and Recreational Therapy, 4567 Scott Ave., St. Louis	Washington University	27 mos. 45 mos.	Sept Sept	2 yrs. coll. High Sch.	$250 Univ. fees	Diploma Degree	13
Columbia University, 116th St. and Broadway, New York City	Columbia University	27 mos.	FebSept	1 yr. coll.	Univ. fees	Certificate	None
New York University School of Education, 100 Washington Sq. E., New York City	New York University	3½ yrs. 4½ yrs.	Varies Varies	1 yr. coll. High Sch.	$450 $450	Certificate Degree	4
Ohio State University, Columbus	Ohio State University	3 yrs.	Quarterly	High Sch.	$100	Certificate	None
Philadelphia School of Occupational Therapy, 419 S. 19th St., Philadelphia	University of Pennsylvania	24 mos. 3½ yrs.	Varies Varies	1 yr. coll. High Sch.	$300 $600	Diploma B. S.	38
Richmond Professional Institute, 901 W. Franklin St., Richmond, Va.	College of William and Mary	3 yrs.	FebSept	1 yr. coll.	$200-$220	Certificate	None
Milwaukee-Downer College Dept. of Occupational Therapy, 2512 E. Hartford, Milwaukee	Milwaukee-Downer College	3 yrs. 5 yrs.	Sept Sept	1 yr. coll. High Sch.	$250 $230	Diploma B. S.	25
Mount Mary College, 2900 Menomonee River Dr., Milwaukee	Mount Mary College	5 yrs.	Sept	High Sch.	$230	B. S.	7
University of Toronto, Dept. of University Extension, Toronto, Ont., Canada	University of Toronto	3 yrs.	Sept	1 yr. coll.	$175	Diploma	33

MEETINGS OF PHYSICAL MEDICINE ORGANIZATIONS

In these columns will be published information about meetings of physical medicine organizations. New data should be sent promptly to the office of the Secretary, 2 E. 88th St., New York 28, N. Y.

American Congress of Physical Medicine, 24th Annual Session, Hotel Pennsylvania, New York, September 5, 6, 7, 8, 1945; **Instruction Course** to be held during the meeting; Dr. Richard Kovács, 2 East 88th Street, New York 28, Secretary.

Midwestern Section, American Congress of Physical Medicine, Drake Hotel, Chicago, Monday, February 12, 1945. Dr. C. O. Molander, Michael Reese Hospital, Chicago, Chairman. See announcement, elsewhere, this issue.

Eastern Section, American Congress of Physical Medicine, University of Pennsylvania Hospital, Philadelphia, Saturday, April 7 or 14th, 1945. Dr. G. J. P. Barger, 1125 Buchanan St., N. W., Washington, D. C., Chairman. See announcement, elsewhere, this issue.

New York Society of Physical Medicine; meetings on first Wednesdays, from October to May, New York City; Dr. Madge C. L. McGuinness, 1211 Madison Avenue, New York 28, Secretary.

New England Society of Physical Medicine, meetings at Hotel Kenmore, Boston, on third Wednesday from October to June; Dr. William McFee, 41 Bay State Road, Boston 15, Mass., Secretary.

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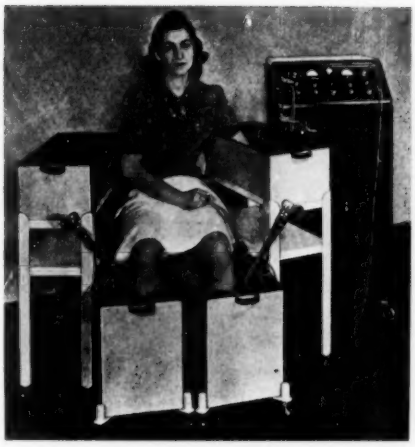

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Medical Physics. Otto Glasser, Ph.D., Head of the Department of Biophysics, Cleveland Clinic Foundation, Cleveland.

Industrial Rehabilitation. Carl M. Peterson, M.D., Secretary, Council on Industrial Health, American Medical Association, Chicago.

Functional Treatment of Fractures and Other Injuries. Harlan Wilson, M.D., Professor, Orthopedic Surgery, Ohio State University Medical School; Resident Surgeon-in-Chief, American Hospital in Britain, 1942, Columbus, Ohio.

Practical Application of Physical Therapy in Rehabilitation. William B. Snow, M.D., Associate in Medicine, College of Physicians and Surgeons, Columbia University; Director, Physical Therapy, Columbia-Presbyterian Medical Center, New York, N. Y.

Artificial Fever-Chemotherapy. (From the Fever-Chemotherapy Section, Chicago Intensive Treatment Center of the Chicago Board of Health.) **H. Worley Kendell, Surgeon (R) U. S. P. H. S.,** Chicago; **Robert C. Craig, P.A. Surgeon (R) U. S. P. H. S.,** Chicago, and **George X. Schwemlein, P.A. Surgeon (R) U. S. P. H. S.,** Chicago.

Relation of the Temperature of the Cabinet, the Patient and Pulse Rate in a Study of 822 Consecutive Fever Treatments. Milton G. Schmitt, M.D., Associate in Physical Medicine, Northwestern University Medical School, Chicago.

Physical Restoration in Vocational Rehabilitation. Dean A. Clark, Senior Surgeon (R) U. S. P. H. S., Chief Medical Officer, Office of Vocational Rehabilitation, Washington, D. C.

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Measurement of Joint Motion. Catherine Corson West, M.D., Clinical Instructor, Department of Radiology and Physical Therapy, University of Minnesota Medical School, Minneapolis.

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A Plea for a More Uniform Terminology. Frank H. Ewerhardt, M.D., Assistant Professor, Physical Therapy, Washington University School of Medicine, St. Louis, Mo.

Some Problems in the Administration of a Physical Therapy Department. Holland C. Mitchell, Capt. M.C., A. U. S., U. S. Veterans Administration, Hines, Illinois.

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Poliomyelitis—Diagnostic Problems Encountered During an Epidemic. A. Theodore Steegmann, M.D., Assistant Professor of Neurology and Psychiatry, University of Kansas School of Medicine, Kansas City, Kansas; and Kathryn Lyle Stephenson, M.D., Fellow in Plastic Surgery, University of Kansas Medical School, Kansas City, Kansas.

Treatment of Military Amputees. Robert F. Dow, Captain, M.C., Chief, Section on Physical Therapy, Percy Jones General Hospital, Battle Creek, Mich.

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Studies on Muscle Innervation. Arthur L. Watkins, M.D., Assistant, Medicine, Harvard University Medical School; Director Physical Therapy Department, Massachusetts General Hospital, Boston, and Mary A. B. Brazier, Ph.D., Research Fellow in Psychiatry, Massachusetts General Hospital; Acting Director, Electroencephalographic and Electromyographic Laboratory, Boston.

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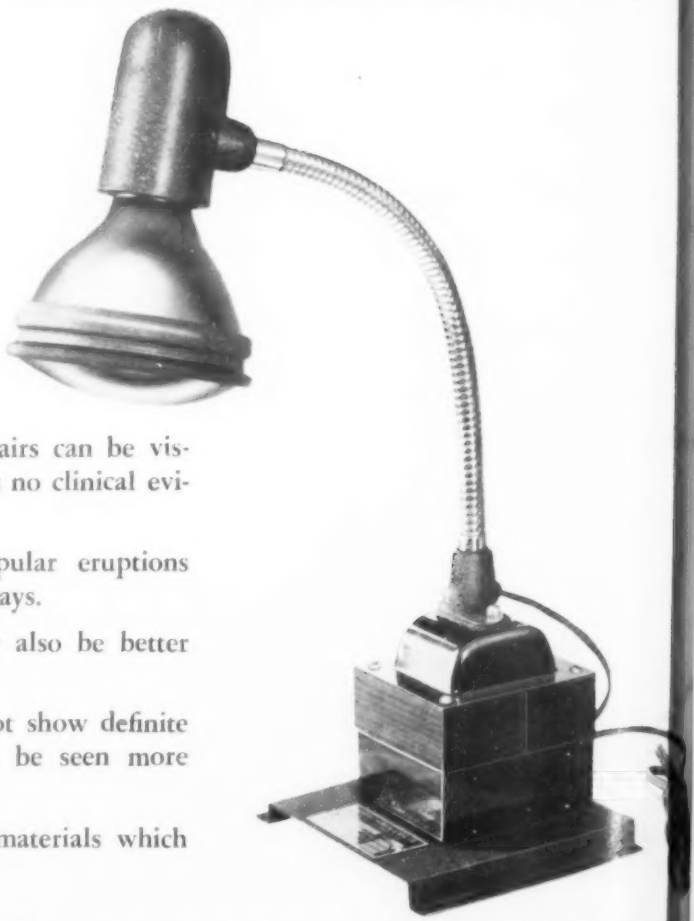

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